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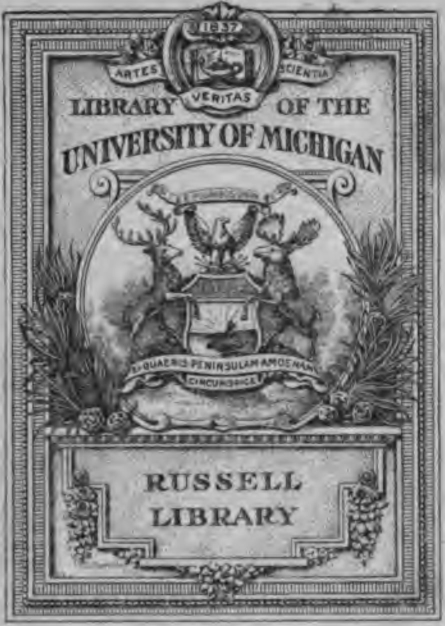

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THE APPALACHIAN MOUNTAIN CLUB

VOL. VIII

1896-1898

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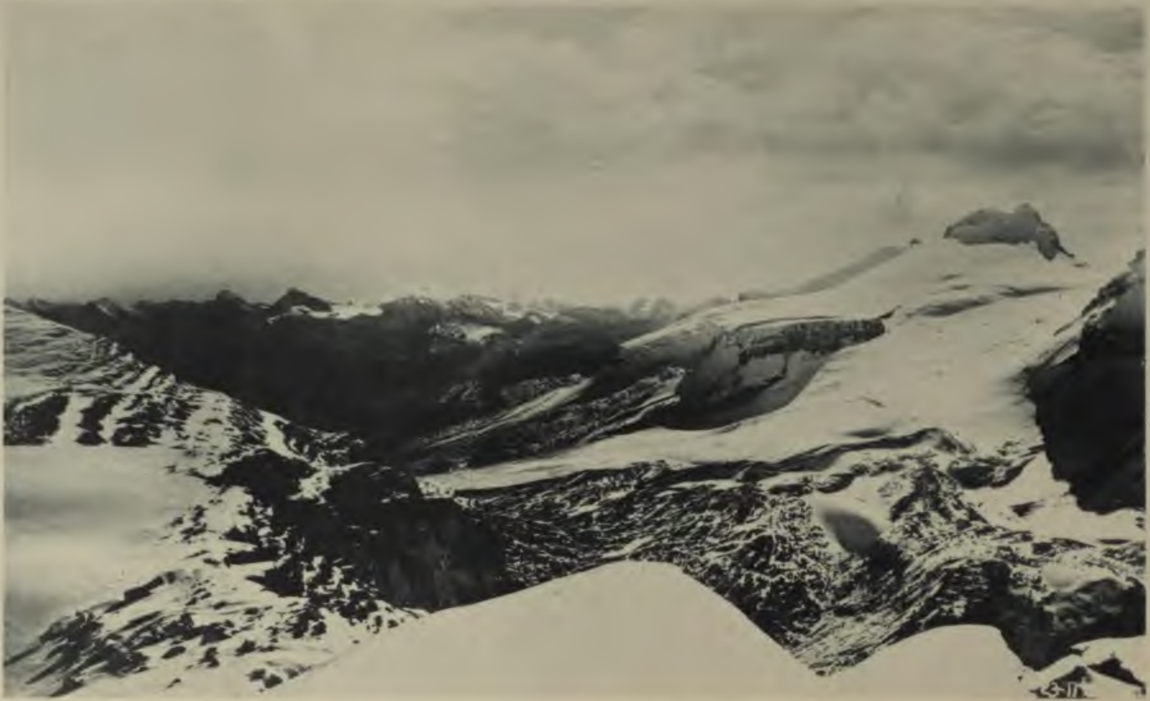


THE ICE SLOPE OF MOUNT HECTOR (11,205 FEET).
FROM STATION 3, ALTITUDE 9,883 FEET, N. 27° W.
From a photograph by the Topographical Survey of Canada.

APPALACHIA.

VOL. VIII. BOSTON, JANUARY, 1896. No. 1.

The First Ascent of Mount Hector, Canadian Rockies.

BY PHILIP S. ABBOT.

Read December 27, 1895.

OUR party that climbed Mt. Hector cannot, I am afraid, lay claim to much glory therefrom. We had no hair-breadth escapes; we did not even encounter great hardships, except such as are familiar to every bricklayer's apprentice. We did not need to exercise great generalship: the mountain was in plain sight, we walked to its base, — some distance, I admit, and not exactly over a paved road, — and then walked on till we reached the summit.

Furthermore, it cannot fairly be said that the expedition was one of unusual beauty. Grandeur of one sort there certainly was. In the single element of savage desolation — unrelieved, monotonous, boundless, and complete — I have never seen anything which equalled the view from the summit of Mt. Hector, and I do not expect to see anything which will excel it. But impressiveness and picturesqueness of detail, beauty of color, and, of course, human interest — except the imaginative interest which came from the mere immensity of the solitude — were, on the whole, lacking.

These are large deductions; but on the other side there are to be said two things. So far as the Club is concerned, Mt. Hector is the first alpine peak (and it can fairly be called alpine) which has been conquered for the first time by an Appalachian party, as such, climbing without guides. We do not claim to have achieved greatness, but we do expect to have greatness thrust upon us, as being the first parents of a very long and illustrious line to come. Secondly, the expedition was an interesting one to ourselves, because it was so fair and even a tussle with Nature — and with Nature in no accommodating mood. We did our own work, and fairly earned for ourselves what measure of success we had. There is a fascination in this which outweighs all æsthetic considerations whatever.

To tell the truth, æsthetic considerations were far from our minds when we left our train at Banff on the morning of Sunday, the 28th of July last. We were fresh from our office desks, and the sight of the gray mountains encircling us on every side made our hearts leap like grasshoppers. How daft we became, the sequel will show. Our first step was to get hold of Wilson, the best guide and outfitter for that region, and to hold a council of war. Many plans were proposed, but none hit our fancy. Finally, for about the tenth time since he joined us, Thompson brought forward his fixed idea. Mt. Hector was reasonably near to Laggan, the next stopping-place of the main party, but not too near; it had never been climbed; better still, it had been attempted without success; and it was high, because the Canadian surveyors, when they turned back (so Baedeker said), had already reached 10,400 feet. It further appeared that Wilson himself had been with that party; and he said that he believed the peak could be climbed. He also told us of an enormous snow-field, lying to the west of Hector on the main watershed, and stretching away to the north for fifty miles, which was absolutely unexplored, and which might perhaps be crossed so as to bring us down into the valley of the Wapta by a new col over the backbone of the continent itself; and not only this, but there was a great snow-peak by the foot of which such a col would have to pass. What more could one ask? We brushed aside the reflection that this was a four or five days' trip; that no horses could be obtained; that we must carry our bedding and food on our backs, and that we had not begun to get into condition; in short, that the plan was absurd. We voted to start forthwith, and separated to make ready for the west-bound train which theoretically left Banff at six the next morning.

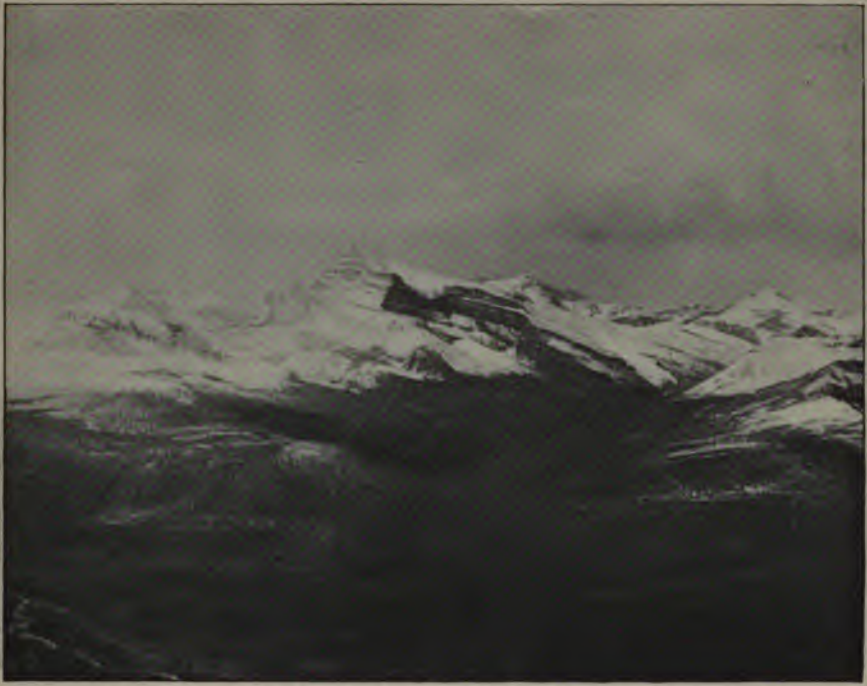
The train falsified our calculations in that instance by arriving nearly on time, and in consequence we had an agonizing five minutes. By a miracle, however, when it moved off, we were all there, — Professor Fay, Thompson, and myself, Wilson as guide, and a taciturn and admirably patient individual named Hiland, who was hired as a porter, and carried an enormous and shapeless pack composed of the tin things and all the other articles which the rest of us refused to touch. The other four of us had rücksacks — blessed be the man who invented them! With ordinary knapsacks we are all confident that we could not have made the trip. Each man carried his own blankets, Thompson the hand camera, — basely ungrateful after all our tender care, — and the provisions were equitably divided. We had four ice-axes, and for abundant precaution three lengths of alpine rope. I had also an aneroid barometer, an excellent instrument, with a proclivity which rivalled Mark Tapley's for taking a favorable view of things. It would have been more useful to us if I had not forgotten to compare its initial reading with the known altitude of Banff. For the rest — with all deference to my companions — we were a queer-looking lot. We none of us had coats; Thompson's sweater had been his companion since his Freshman year in college; as for Professor Fay's — "de mortuis nil nisi bonum." He purposely left it after dark on the upper slopes of Mt. Stephen.

From Banff to Laggan — thirty-four miles — the railroad follows the broad glacial valley of the Bow, running in a northwesterly direction toward the heart of the range. A mile beyond Laggan the two separate: the railroad bends sharply a little to the south of west, and climbs the Kicking Horse Pass over the continental watershed, and the river turns to the north. On the left or western side of the Upper Bow valley, as you look north from Laggan, is a line of cliffs two or three thousand feet high, their evergreen-clad talus slopes rising abruptly from the level floor of the valley. These cliffs are outposts of the Continental Divide; behind and above them, on the summit of the divide, but wholly concealed from below, lies the great snow-plateau I have spoken of. The eastern wall of the valley begins from Laggan much more tamely, in a broad low ridge, covered with burnt timber, which looks for all the world like a bit of New Hampshire. This lifts itself gradually to the altitude where a narrow belt of green forest still holds its own, and keeps on rising until the shale slopes of its crest begin to be mottled with snow; but it never becomes bold or mountainous. Eight or ten miles above Laggan the ridge is cut by a great gorge many hundred feet deep. Immediately beyond this gorge rises a single great peak, finely proportioned, massive rather than spire-like, with a coronal of black cliffs below its summit which are unrelieved by a spot of white. This is Mt. Hector.

Its tremendous southern precipices shoot up so suddenly, and its isolation is so complete, that even from Laggan Mt. Hector is the one feature of the view. We watched it eagerly from the station platform as we walked to and fro, giving our packs an occasional twist, waiting for breakfast to be ready in the section-house. As a matter of shape and outline, the mountain is finer from this side than from any other, but from a climbing point of view it is fortunate that it is double-faced. One does not risk much in prophesying that neither the southern nor the western wall of its final peak will ever be scaled.

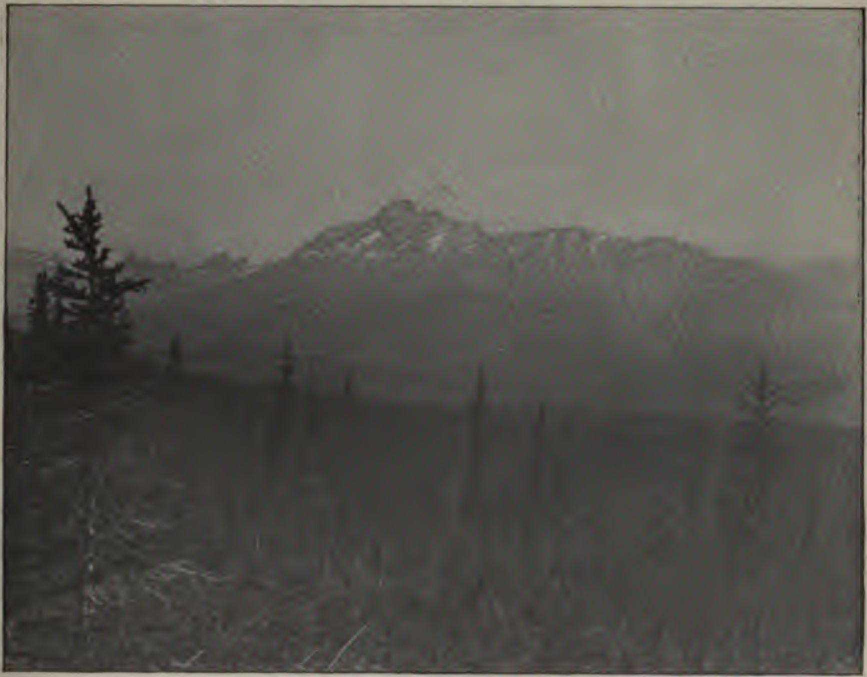
As for the valley — our more immediate concern — we saw in front of us the relics of an enormous terminal moraine choking it from side to side; and the bristly growth that covered this was gray instead of green. Wilson had warned us that we should encounter burnt timber, and he was certainly right. It cannot be less than twelve miles from Laggan to the foot of Hector, and I suppose it is not so much as fifteen. Of the total distance, one mile is along the railroad track. Of the rest, a little more than half had been swept by fire, and the remainder was swamp.

It was half-past nine when we finally started up the track with a swinging gait that was much too good to last. It took us three or four hours to work off our boyishness. The sun was hot, and beat down on the gravelly soil as freely as though the charred skeletons of the forest had never existed.



MOUNT HECTOR FROM THE EAST.

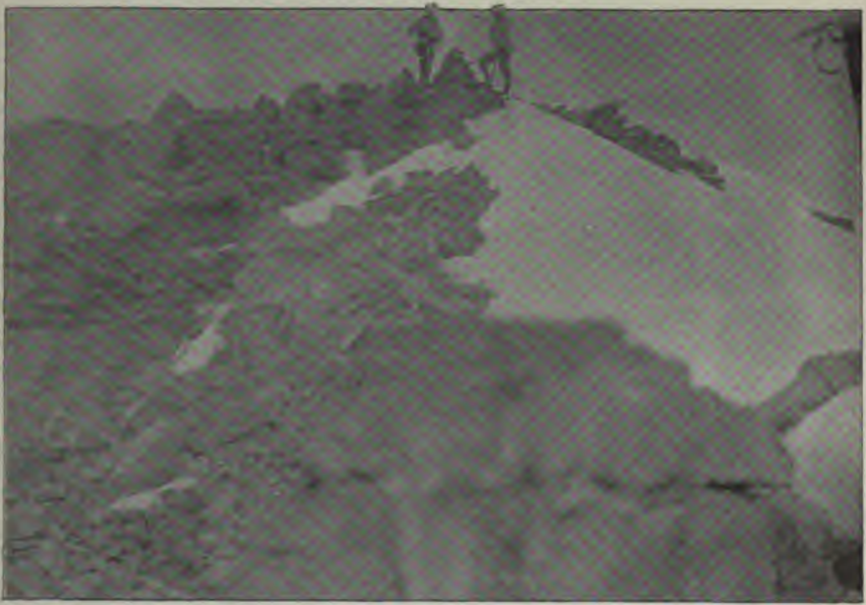
From a photograph by the Topographical Survey of Canada.



MOUNT HECTOR FROM THE SOUTH (NEAR LAGGAN).

From a photograph by Parker D. Field.

THE SNOW FIELD BELOW THE SUMMIT OF MOUNT HECTOR.



THE A. M. C. CAIRN ON MOUNT HECTOR.
From photographs by Charles E. Fay.

Multitudes of these had fallen, and lay across each other at all sorts of angles. We climbed over them or walked along them. To do this we had to take hold of them. The perspiration was streaming down our faces; we put up our hands and left finger-prints, which were well marked at first, but gradually became suffused and blended. We found that no form of pack is of assistance in balancing along a narrow log, but that our ice-axes, there as elsewhere, were invaluable. We used them as claws and as balancing-poles; we made blazes with them, and chopped away underbrush; the heads were convenient to sit on for a moment's halt; later we used the handle for a fishing-pole; and I think I have seen one of our party use the head of his axe to pass sardines at a picnic lunch. Not even the tail of a South American monkey is more variously adaptable. Every half-hour we sat down, fanned away the mosquitoes, and told one another what remarkable progress we were making; and finally, when the humps and hog-backs of the moraine were passed, and we came out by the river, we thought ourselves in Paradise. We lay down in the hot sunlight upon the grass of the bank, and dabbled with our hands in the green water, and watched the sweep and swiftness of its tumultuous and yet strangely silent flow. In these glacial rivers, except when their current is checked, there is none of the brawling of our own mountain streams, — only a half-sibilant hushing murmur. It more nearly hypnotizes one than any other sound I know in Nature.

By this time we had rounded the southern end of the low ridge to the east, and our course, instead of bearing a little to the west, turned due north. The valley broadened, and became almost as level as a billiard-table. The trees stood more sparsely, and here and there were not all burned. They were poor specimens, though, — spindling, starved-looking pines, that would neither blend into a forest nor look masculine as individuals. Now and then came little interludes of meadow, rather moist, but cool and soothing to the feet. Simultaneously we began to notice that the mosquitoes were making themselves too prominent. We had had them before in decent numbers, but now, when we stood still, it became a penance to stop flapping long enough to light a pipe. This began perceptibly to dampen our flow of spirits.

We lunched at three, principally on boiled tea, bread and jam, and fried pork eaten with the fingers. By this time we had uncovered enough of the west, or valley, side of Hector to be able to begin to consider our next day's route. As we saw it now, the mountain could not honestly be called graceful. It consisted of a high ridge or wall, with its crest about four thousand feet above the valley and perhaps a mile in length, sagging slightly at the middle, rising slightly at the northern end in a comical little protuberance which we nicknamed "Astyanax," and shooting up very suddenly at the southern end to form the summit proper. Somehow the final peak also did not impress us as dignified; it was too small for the bulky foundation from which it sprung. The whole mountain reminded me, from this point, of a canal-boat, with its prow ("Astyanax") rather high, and a pepper-box of a deck-house (the final peak) on its stern. We had occasion later to change our minds concerning the size of the pepper-box.

One thing was clear from the first glance. A direct attack from immediately below the summit was impossible. Our only chance was to win the crest of the main ridge some distance north of the final peak, and pass around to its unseen northeastern side, in the hope of finding there some line of ascent. So far as reaching the crest was concerned, a number of parallel ribs or buttresses, descending to the valley, offered a simple and very easy line of approach up to a certain point, where two or three horizontal limestone strata, apparently sheer, cut across the face of the entire wall, and at all points except one interposed an insuperable barrier. This point, where the strata appeared to be broken down and reduced to a slope of shale, was above the largest and most southerly of the buttresses, the one which is separated by a great amphitheatre from the abortive southwestern arête running down from the summit. By this buttress, therefore, we must ascend. It seemed as though we might reach its foot in an hour, push up through the timber, camp at the tree line, and so be in readiness to begin the next day's real climbing as soon as it was light.

It took more than two weary hours of swamp and mosquitoes before we reached the point where it seemed to me that we ought to turn off; and then Wilson objected to doing so, saying that he had camped the time before at the shore of Bow Lake, only a little way ahead. Our packs, too, were silent monitors urging us to keep on level ground; so we yielded, and tramped on. There were very few small jokes now. Six o'clock came, then seven, then eight, and no sign of the lake. The sun had set, and the mosquitoes were so thick that we could hardly see one another. About half-past eight Wilson said that the lake was still nearly half a mile away, and admitted that his camp was on a sandy spit between the water and the swamp. That settled it. There was no question now of reaching timber line, or even of returning to the foot of our buttress. We simply plunged into the pines of the lower slopes, not knowing where we were, and not caring much, if only we could get firm ground, a place to build a smudge for the mosquitoes, and a chance to throw down our packs. A hundred feet or so above the valley we found an opening in the woods, with a stream near by, coming down from the snow above. It was not a convenient place, for our fire had to be kept very small for fear of kindling a forest fire. But we would not have moved on for a palace.

It was half-past ten before we had finished supper, untwisted and stretched our rope, got things together for the morning's start, and were ready to turn in. Our plan was to be up by three. This became doubly necessary when we learned that Wilson must return to Laggan the next day, and could not give us the benefit of his knowledge of the ground during the first part of the ascent. Moreover, we had to leave time, after descending, to cross the Bow River, walk around the lake, and camp at its head so near the glacier coming down from the snow-field that we could be on the snow by sunrise the morning after.

Sleep was not easy that night. To lie with our heads exposed, at the mercy of the hordes of mosquitoes, was not to be thought of. We curled up in Indian fashion, with only the tips of our noses out. The night was warm, and we sweltered; but at least we imagined we could defy the multitudinous hosts of hell outside. Far from it. They could not bite us, it is true; but whole orchestras, shrill with rage, hovered above us and all around. Some even crept into the folds of the blanket underneath my ear, so as to make more noise. I stood this for an hour, twitching with nervousness; then gave it up, and crawled out into the smoke of the fire. Thompson was really asleep, being protected from the tumult of the mosquitoes by clamors of his own not wholly dissimilar. The others were only feigning. I stumbled out into the darkness, and replenished the embers of the fire with a few dead branches, and then lay down where the smoke blew over me, and lit my pipe. The night air was moving through the branches of the pines above us, which waved and creaked drowsily, now hiding and now revealing the stars. At rare intervals some small animal rustled over the dry twigs. Otherwise the night was absolutely still; even the brook had become silent under the influence of the evening frost higher up. The pine needles were soft, and it was almost as good as sleeping to puff away at one's pipe and watch the flickering of the firelight on the tree-trunks, and reflect that the nearest town was forty miles away, and that the wilderness in whose heart we lay stretched on without a break to the shores of the Arctic Ocean. By and by Hiland, the porter, threw off his blanket and came and smoked his pipe also by the fire, and told me endless yarns about grizzly bears. Finally I crawled back into my blanket, and the next thing I knew was the hateful sound of Professor Fay's voice announcing that it was three o'clock.

Then followed the usual accompaniments of an early start, — the search for water in the darkness; the depressing chill of the dying night; the half-warmed and wholly unappetizing breakfast; the silence, not to say crustiness, of the other members of the party; the unconfessed half-wish for some decent excuse for not starting at all; and the interminable delays. Before we got off, it was twenty minutes before five, and the twilight had almost brightened into day.

In a general way, we knew that we had gone too far up the valley the day before, and must bear to the south; we hoped, however, that we had not passed the northern end of the slopes which led up to our buttress. Fortunately we were right, but by a very narrow margin. If we had started up the north bank of the brook by which we had camped, it would have cost us at least an additional hour, and might not impossibly have landed us finally in a *cul de sac.* As it was, we bore to the right through pleasant open woods, each member of the party taking the lead in turn; and when the trees thinned out, about six o'clock, we were relieved to see above us what we knew from our observations of the day before to be the beginning of the buttress proper, — a great rounded shoulder, almost a mountain in itself, which we had picked out from the valley as a landmark.

This part of the climb was encouraging. The footing was good, we kept to our work steadily, and every step told. Soon the steep grass began to give place to gentler shale slopes, and these in their turn became steeper and more fatiguing. The sun had risen long ago on the cliffs across the valley, and the golden line was creeping across the floor, which lay in clear day far below us, with the windings of the Bow and the alternation of open swamp and woods shown as though on a map. But we ourselves were in shadow; and the keenness of the air was not tempered by the early morning wind, which came down intermittently in gusts and made our hats flap viciously about our ears, — oftentimes so suddenly and so straight down that it gave a sort of shock like a douche from an icy shower-bath. The pace began to tell a little. Out of a sense of duty, we stopped at half past seven for a brief and rather shivery second breakfast, but the inclination was wanting to eat what we really needed.

The passage of the limestone strata — elsewhere, as we now saw, a perfect barrier — proved even easier on our buttress than we expected. The cliffs were broken down so completely that we scarcely needed the help of our hands. Above the strata we were glad to exchange the wearisome shale, which now was very steep, for two or three long patches of winter snow, up which we zigzagged, kicking our steps and keeping guard with our ice-axes against slips, with an excess of caution rather ridiculous to look back on. None of us had our alpine legs as yet. The snow grew thin and petered out, and we were forced back on the slopes of shale, steeper than ever, and apparently endless. Our enthusiasm of the first two hours had been a little too much for us; we paid the penalty now in a lassitude which was only half justified by the despicable footing. Fortunately, however, our slopes were not really eternal. By and by the distance began manifestly to decrease between us and the edge of the cliffs, and by nine o'clock we were almost there, — still in the shadow, with nothing in sight more alpine than the steep rock slopes and precipices up and between which we had come, and with the real difficulties and problems of the ascent as unknown as when we started.

The same step which brought us over the edge of the plateau created a new world. In front, almost blinding from the reflected rays of the morning sun, there stretched a broad and almost level expanse of dazzling white; sinking very gradually to the northeast, rising as gradually to the southeast, and toward the south first rising slowly, and then suddenly lifting itself up in a splendid snow-peak, nobly proportioned and very steep. Except for two or three dark lines which indicated crevasses, and except for a few rocks outcropping along the two arêtes and just below the summit, it was as pure and perfect an alpine picture as can be found anywhere. I do not know any other mountain so completely deceptive. From Laggan and from the Bow valley, one does not get a suggestion of the real character of the final climb.

Our first impulse was one of pure admiration; our second, after a careful scrutiny of the details, was to say to one another that if we were careful and took our time, the game ought to be in our own hands, but that it was no mere holiday excursion — to us, at least, for one member of the party had never climbed with the other two, and one had never had occasion to use axe and rope. There was little to fear from crevasses in themselves; but on the upper part of the peak the snow lay at as high an angle as snow ever lies except in couloirs, and there was enough of a bergschrund below to make a slip very undesirable. The climb was worth coming for, at all events. The fatigue of the last two hours had vanished; we felt as fresh and eager again as we had felt the day before at Laggan when we first saw our goal. We ate another light lunch, disburdened ourselves of one rücksack, put on the rope, — I ahead, then Thompson, and then Professor Fay, — and were off again at 9.30.

So far as choosing our way was concerned, there could not be a simpler problem in mountaineering than the one before us. To the south, along the edge of the valley cliffs, the plateau was level for a distance, and then for a while rose gently; but about a third of a mile away, where it merged into the northern arête of the peak, it sprung up in a succession of perpendicular steps which effectually barred all progress in that direction. The other arête, the eastern, was similarly broken at more than one point, and was too far away. The face between, on the other hand, was virtually uncrevassed except by a single good-sized bergschrund, and this was well bridged a little to the right of its middle point. Our cue, therefore, after following the edge of the valley wall to the foot of the first great step, was to cut adrift from the arête, strike off to the left, and zigzag to and fro up the snow-slope.

Up to the foot of the step, and for a short way beyond, we went along merrily, for the snow was in perfect condition. Then, as the angle increased, we planted our feet with greater deliberation. Then I had to kick footholds, — first mere notches, then full-sized steps, — and finally we brought into play the holding powers of our ice-axes, not only for balance while kicking, but for actual support and distribution of weight. From the member of the party who had never used an ice-axe before, there became audible a steady pæan of thanksgiving to the inventor of that admirable implement, which beguiled the monotony of our way until the speaker's breath was required for other purposes as the slope grew steeper.

By the time we had passed the bergschrund, the angle was one of at least 40°. There had been little choice of way hitherto. Like most snow-faces, this one was not flat, but consisted of broad rounded swells and hollows; and we had merely tried to avoid the latter because of the relative steepness of the concave slopes above them. Above the schrund, however, certain natural stopping-places developed themselves. The first was a sort of level platform, far to the right and above, on the edge of the northern arête. This enabled us to rest a moment and to signal to Wilson, who was waiting below to start for Laggan. Some distance above this platform, the arête was notched more deeply than usual, and a sort of funnel-shaped gully ran back a little way into the face of the mountain. Above this gully the arête seemed to turn a little to the right, so that it formed a sort of promontory projecting farther toward the valley than it had done below. From here up there was an uninterrupted slope to the summit; short — perhaps only one hundred and fifty feet — but as steep as snow can lie on in an unsheltered place. It was not all snow, however; the edge of the arête was of rock, and for the upper hundred feet, this broadened out so as to form a narrow face, offering — so it seemed from below — an easier passage than the snow.

We could reach these rocks by a long zigzag to the left and then back; and I calculated that we could profitably keep on as far as the eastern edge of the snow-face, and perhaps get a view there. We were so near the top now that the two arêtes had converged greatly. As we approached the eastern arête, however, it looked deceitful. Nothing could be fairer to the eye, — the smooth snow easing off a trifle in its steepness a few feet this side of the edge, as though to tempt us to find a pathway there. Personally, however, I preferred not to try experiments; investigation by one of the party — still on the rope, of course — confirmed my suspicions that it was a cornice.

When we began our long zigzag back, we knew that we were on the home stretch. We were monstrously cautious! I can testify personally that the steps I kicked were as large as coal-scuttles, and I inferred from what I heard behind me that Thompson was kicking them larger still. We had a good excuse, however, after we had got far enough back toward the northern arête to be above the gully I spoke of. If we had slipped within reach of its funnel-shaped mouth, there would have been no question of rolling down a comfortable slope of snow; we should have gone down a brief chute, and then been shot out over the edge of an abyss offering an uninterrupted descent of not less than a thousand feet. Therefore we took our time. At one spot we found the snow getting thinner; and our bootnails, when we kicked, rebounded from hard ice. This, of course, meant cutting steps. Very quickly, however, the snow grew deep again, and in ten steps more we put our hands on the first of the final rocks. We scrambled up the last hundred feet in pretty good time, for we knew the mountain was won, and at precisely 12.30 stepped on the summit. This was itself a little ridge of broken rocks; the snow on the northeast came up to within a foot of it, and then stopped.

One feels great reluctance in attempting the description of a mountain view; and yet two things should be said in regard to this one from Hector. There are few summits to which the approach is so spectacular. We had been climbing for three hours with our horizon limited by the edges of a narrow field of snow. We came to the end, — and it was as though we were suspended in mid-air. For three fourths of our circumference there was nothing below us for the eye to rest upon except so far below that it did not seem part of the same world. Professor Fay said afterward that no view he had ever seen gave him so astonishing an impression of being lifted up; and I can sympathize with him. Secondly, in its broader aspects, the view is one which in its own kind can scarcely be matched by any known peak in the Rocky Mountains of Canada, and that demonstrably cannot be matched in any other mountain system in the world except in Asia. There is no region of snow mountains in our own country, in South America, or in Australia which can equal the Alps in extent and height combined; and in the Alps I think there is no summit where the distant view is wholly mountainous which is not closely shut in, or else from which either the plains of Italy, of Germany, of France, or of middle Switzerland are not visible. But from Hector, though the eastward view was much the least imposing, yet the line of peaks of cold gray rock which finally hid the plains of the Saskatchewan were not less than thirty miles away, and the intervening space was crowded with range upon range of other mountains;

on the west, over the great snow-field and the mountains around the north branch of the Wapta, our vision was bounded by the Selkirks, fully eighty miles distant as the crow flies; and on the north and south there was no limit. As far as our eyes could reach in those two directions — and that was about as far as the human eye can ever reach, for the day was brilliant, with no hint, from horizon to horizon, of either cloud or haze — there was nothing visible but the one unbroken wilderness of ice and snow and crag, an ocean without shores whose waves were mountain ranges.

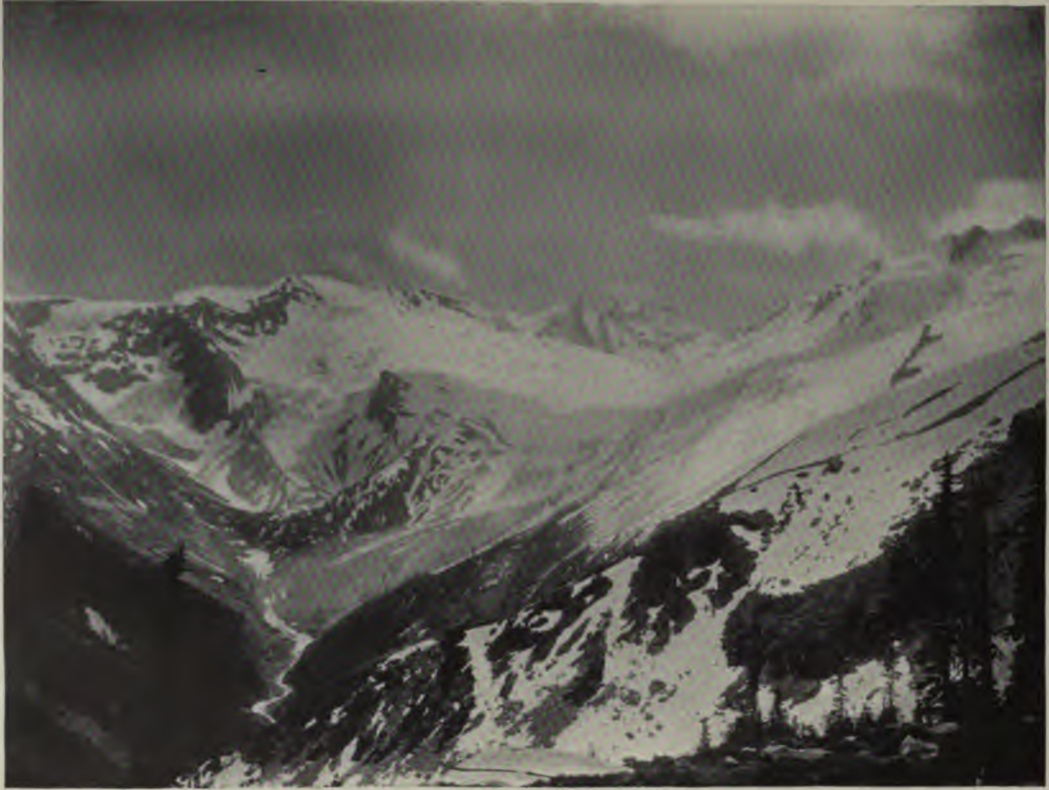
Something like this, it is true, can be seen from many neighboring peaks; but it cannot be seen so well from any other summit as yet attained, because no other combines so perfectly both height and isolation. There is nothing around Hector to interrupt the view in any direction, not even a cluster of secondary peaks; it stands peculiarly alone. As to height, we can speak from inference only. Our aneroid reading was worthless. We knew, however, that the previous party had turned back at an altitude of 10,400 feet, and from Wilson's account we believed we could identify their highest point. From this point to the top, our aneroid showed a rise of 800 feet. Allowing for an error of 200 feet, — an extraordinary proportion when one is going steadily, — we should give the summit an altitude of at least 11,000 feet. If this is so — I speak here subject to correction — Hector is the second highest mountain in Canada whose ascent has been recorded. Moreover, of those not climbed, there is only one other of equal height, and equally central in position, which stands alone in the same way. This is Mt. Balfour, the snow-peak nearly due west from Hector, rising from the middle of the great plateau of névé which at this latitude covers the Continental Divide. The view from its summit would be worth crossing the continent to get. I do not mean, of course, that a panorama of this kind, without foreground and without relief, is so fine as views of many other kinds, for it is not. But I do say that, *within its kind*, I know of no other view, and outside of the great ranges of Central Asia I believe there is no other anywhere, that is so overwhelming as this from Hector.

It might be well for our reputations if I were to stop here altogether. Our senior, indeed, conducted himself rationally while on top, spending his time in photography and other good works. Thompson can plead in extenuation that he built the cairn underneath which Macaulay's New Zealander will find a jam bottle, partly but not wholly clean within, containing our names. But for my part, — regardless of the proprieties, and of the further fact that the summit rocks were angular and that the wind was cold, — as soon as the first congratulations were over, I deposited myself in the nearest approach I could find to a sunny corner, and went to sleep. It has been reported to me that Thompson soon after did the same, but I am not competent to testify on this point. I only know that I never relished a nap more thoroughly. After half an hour I tried to retrieve my reputation by studying our intended next day's route, and particularly Mt. Balfour, through the field-glass. Two or three great schrunds seem almost wholly to encircle it, and it is doubtful if the arêtes are practicable; but I am confident that a somewhat circuitous route can be devised which will successfully avoid all obstacles.

We stayed on top for over an hour, till we were shivering with the wind. I don't think we quite enjoyed the idea of descending the first two hundred feet, chilled as we were; but two reflections helped us, — we had little choice in the matter, and the worst part came at the beginning. We roped in reverse order this time, — Professor Fay first, then Thompson, I last. Professor Fay says the rocks were simple, but that he did not wholly enjoy the traverse above the gully, and Thompson agrees with him. I maintain that the rocks were not all they should have been. They needed sweeping badly; they were steep; they offered very few good handholds; and, most objectionable of all, they tended to slope out. The latter point, especially, is appreciated by the last man on the rope. However, we took all the orthodox precautions. We moved only one at a time, the others holding the rope taut, or standing ready to help, as the case might be. We made use of all our surfaces of adhesion, our rate of speed and manner of progressing reminding one at times of the motions of the garden slug. When we left the rocks, we crept across the bit above the gully like the villains in a melodrama about to commit a crime. But when we had left the gully behind, our minds relaxed, our attitudes became normal, and our spirits gradually rose. The pace quickened correspondingly, until, after passing the bergschrund, we broke into a trot, and let ourselves tumble occasionally in pure wantonness. By three o'clock we reached our impedimenta at the edge of the valley wall, rather breathless, hungry, thirsty, very hot, but triumphant.

The next two hours and a half have nothing to recommend them in the memory, except a few moments spent in descending the same long and narrow patches of snow up which we had crawled in the morning. The sun had now melted the surface layer so that it was as slippery as grease. It was sufficient to fling ourselves down, and dig in our ice-axes behind us; Nature did the rest. This was good fun; but for the rest I have only an impression that my knees ached with the incessant pounding, and that the shale in which we slid filled my boots with sharp pieces of rock, and that the air of the valley into which we were plunging was hot, and heavy, and dead, and full of mosquitoes. We did not aim for our old camp, for we had told Hiland to move the packs down to the Bow River. There we found him, and, to our surprise, Wilson also, who had never seen our signals at noon, and had waited in growing fear lest we might have broken our necks. It was 5.30 when we reached the rocks, almost thirteen hours from the time of our morning's start; a needlessly long time, of course, for a party in good training who were confident of their own powers and knew one another.

As we were eating (with our fingers, I regret to say) some freshly caught trout that Hiland had ready for us, Wilson gave us a few final directions for the evening's work still before us — the approach to the snow-field — and hurried away. We had not much heart for starting off again with thirty pounds apiece on our shoulders. On the other hand, no place could be worse than where we were. So we girded ourselves up, and moved on up the river, a little stiffly perhaps, in search of the place where Wilson said it could be crossed.



THE ASULKAN GLACIER AND NÉVÉ.

From a photograph by H. W. Peabody, Boston.

We could have hung somebody with pleasure two hours later. We had plunged through thickets of various kinds, and plashed through swamps; we had balanced ourselves across creeks on slippery logs; we had been to the lake and half-way back, and had examined every foot of the river for nearly a mile, and the upshot was this: it was possible to try the experiment of tying the rope around our waists and fording (or attempting to ford) a river of snow water, one hundred feet broad, running at least shoulder high in the centre and very swiftly; and then we could dry ourselves as best we might in the gray of the evening, tramp three miles and a half around the opposite shore to the head of the lake, and rise before daylight the next morning to attack an unknown glacier, and unknown snow-fields of great extent. On the other hand, we could admit that we were beaten, camp where we stood, between river and swamp, letting the mosquitoes do their worst, and return to Laggan the next day by the way we came.

We chose the latter, and joined our party at Lake Louise the following evening; but I know at least one member of our trio who means sometime to find himself once more at the foot of Bow Lake, at an earlier hour of the day, and sufficiently equipped to raft across if necessary. The memory of the great snow-field as we saw it from Hector, and of Mt. Balfour above all, is an abiding and haunting one.

Mount Castor and the Asulkan Ridge.

By Charles S. Thompson.

Read December 27, 1895.

On Saturday morning, August 10, we left Glacier House by the Marion Lake path for the summit of Mt. Abbott. Our start was late (9.25), our plan indefinite. Certain of Huber's photographs, taken from the base of Uto Peak, show a long rock ridge, with ragged sky line, extending south from Abbott and culminating near the summit of the Asulkan Pass in two snowy peaks, finely twinned. Toward Abbott the eastern wall of this ridge falls precipitously; nearer the twin peaks it is hidden behind steep snow-slopes, which, broken by crevasses, roll in successive terraces to the glacier-filled valley below. Of the western wall we could learn nothing. Beyond, as we knew from Green's map, lay the Lily Glacier and the superb mass of Mt. Bonney. We proposed, if the ridge were passable, to advance thereon from Abbott as far as our shortened day would allow. Our hearts said what our lips dared not affirm, — that we would climb "the twins."

On leaving Marion Lake (10.40), instead of following the usual route along the boulder slide at the head of the basin, we climbed diagonally up the right hand or northern side, through a tangle of fallen stones and dwarf spruce. In about fifteen minutes we emerged above the tree line, near the head of a steep gully looking, far below, upon the Valley of the Loops. Our course lay to the head of this gully, then up a difficult rock chimney, undertaken in a spirit of wantonness, and out upon the wilderness of snow and stones which forms the northern brow of Abbott. Twenty minutes later we were upon the arête, a wall-like ridge, less than fifteen feet wide and nearly half a mile long, rising gradually to the south. By noon we reached its well-remembered highest point.

Our route for the next quarter-mile now lay clearly before us. The ridge, at first slightly depressed, turned, a short distance beyond, abruptly to the west. Upon this ridge, one in the angle thus formed and the other at the western extremity, were two peaks, both higher than the point on which we stood. The nearer of these peaks seems, logically, the summit of Mt. Abbott; the farther one, hitherto nameless, we call Mt. Afton,[1] — a conceit for which we are, I trust, duly pardoned.

A momentary halt for photographs, a quick decision not to climb that southern summit of Abbott, then speedily downwards to the snow-field which filled the inner angle between us and Afton. We had a glorious day, clear, invigorating, most comfortable upon the arête. In the snowy hollow it was entirely another matter. Cut off from the breeze, doubly warmed by the reflected rays of a midday sun, reddened and perspiring, we trudged up the yielding slope. Such conditions drive men to drink. On our side of the ridge water was not to be thought of. Mr. Fay assured us that he had found it upon Mt. Abbott the preceding summer, but with scanty time it seemed less waste to try the farther (southern) slope of the col between that peak and Afton. Through a cleft so narrow that we steadied ourselves by a hand on either side, we passed to the head of a scanty grass slope. Marvellous change: one moment toiling across a snowy arena, facing low gray walls; the next, on a breathless declivity sweeping in one view the Illicilliwaet névé, the glacier-filled Asulkan Pass, the cone of Mt. Fox, the whitened wall of Dawson, and the twin pyramids, — snow and rock, an Arctic landscape. At our feet, precipice succeeding slope, lay the terminal moraines of the Asulkan Glacier, two thousand feet below.

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[1] This peak was first ascended, so far as we can ascertain, by Professor C. E. Fay on August 14, 1894. See APPALACHIA, vol. vii. p. 296.

We crept down a hundred yards to where a snow-bank promised a trickle at its lower end. Here were made sundry experiments, not wholly satisfactory, on the time required to settle troubled water; then we lunched. The hitherto untraversed portion of the ridge was now entirely in view; eating, we discussed its possibilities. Between Afton and Castor and Pollux (for so we called the twin peaks) were two well-defined summits and three marked depressions. The air-line distance was about two miles; the general direction south or at right angles to the Abbott-Afton col which we had just crossed. Beyond the second depression all was clear going; any prohibitive difficulties we might meet would lie nearer Afton. From where we sat the black unassailable precipices of that portion of the ridge resembled in form and slope the face of a gigantic breastwork, a mighty "Rampart" over whose top towered the tentlike summit of Mt. Swanzy.[1] The crest seemed, as indeed we subsequently found it in many places, a sharp knife-edge. If the western side offered as true a rock-face as the one before us, our passage confined to that edge was indeed doubtful. A great gulf lay between. To reach that rampart it seemed best to return to the snow-field behind the col.

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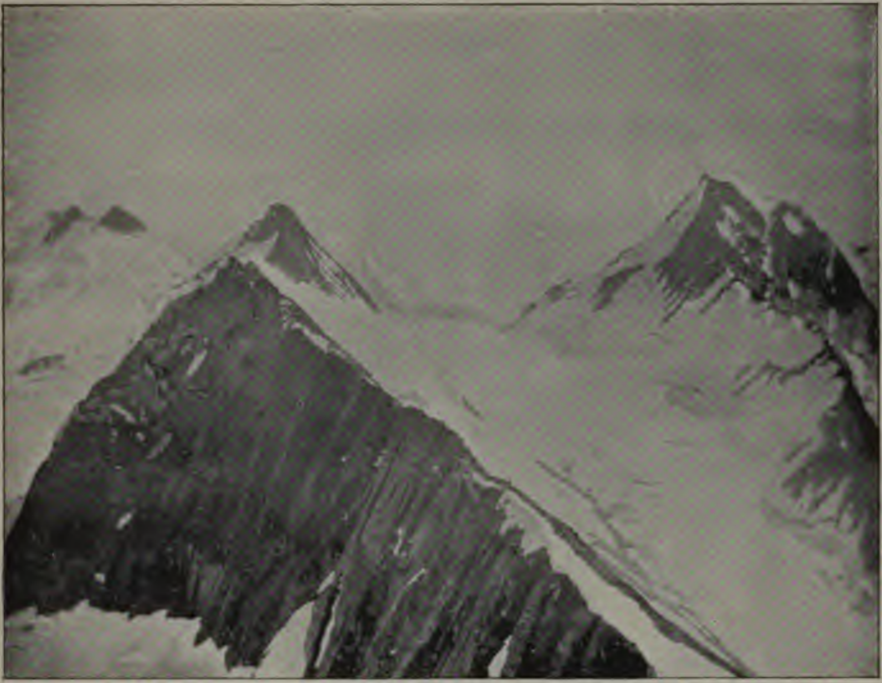
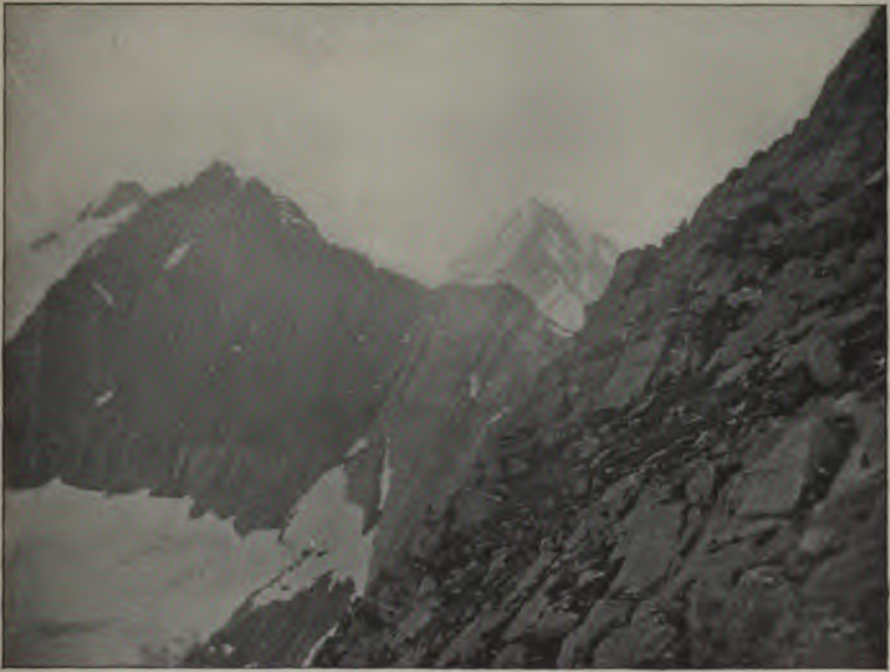
[1] A subordinate peak of the Mt. Bonney group; so named by us after the Rev. Henry Swanzy, Mr. Green's companion during his Selkirk explorations in 1888.

At a quarter of two we faced the snow-slope which reaches far up the northeast side of Afton; a moment later, without putting on the rope, we were vigorously kicking steps up its hardening surface. Although not so steep as the snow upon the final peak of Hector or in the couloir on Lefroy, the absence of the rope gave a breath-catching zest to our labored advance. There was no physical danger, no schrunds or crevasses, and three hundred feet below, after the steep pitch, a gently inclining snow-field over which to bowl. Unaccompanied, without ice-axe, one of our trio had voluntarily glissaded upon it at the time of his former visit, and we had his word that it was an experience well to be remembered. And yet, methought, he drove his pick as deeply and marked his step as carefully as either Abbot or myself. It was a place for vivid imagination. As I watched that lithe, nimble figure before me, cautiously moving now foot now ice-axe, I could see that other August afternoon when, trailing clouds of snowy glory, it scudded, gravity driven, to the col beneath. What a gorgeous halo then encircled that hirsute countenance, sign facial of future canonization in the brotherhood of mountaineers! After snow, rocks. Writhing, twisting, turning, seeing little before and much below, we wormed our way up. 'T was "every man for himself;" modesty and my position in the party forbid the truth of a continued quotation. At twenty-five minutes past two we sat among the frost-riven boulders of the summit.

I cannot adequately describe the beauty of the view. Over against us, westward, towered the glittering crescent of Mt. Bonney, holding between its horns the many glaciers of Loop Valley. Over that valley, far to the north, within a sea of mountains, rose two remarkable peaks. The higher, impressive by its snow-clad mass, was scarred by a great black wall, apparently a cliff at the end of its southern arête. The other, sharp as a shark's tooth, recalled Mt. Assiniboine. But the spire of Assiniboine is single; here two minor shafts supported the central spire. Farther to the right over now insignificant Mt. Abbott were the peaks of Rogers Pass; then Avalanche, Eagle, Sir Donald, and the monolith of Mt. Macoun, just rising beyond the Illicilliwaet névé. The southern view differed somewhat from that at the col, for now we saw



VIEW OVER THE RAMPART UPON LILY GLACIER AND PASS
FROM THE SUMMIT OF MT. AFTON.



THE DOME, THE RAMPART, AND MT. SWANZY
FROM BELOW THE ABBOT-AFTON COL.
From photographs by Charles S. Thompson.

the western wall of our ridge and the névé of the Lily Glacier, a straight smooth highway to the pass between the Dome[1] and Swanzy.

Our path was now well in hand. If the crest failed, we could traverse that western side; farther on, if need be, we could pass thence upon the Lily Glacier. Two of us hastily raised a cairn; the third rested quietly, dreaming perhaps of summits yet to fall. But time pressed, — from now on trod upon our heels. Face outward, we slid rapidly down Afton's boulders, passed upon the Rampart, and worked steadily toward its summit. Advance upon the arête was thoroughly enjoyable; more than once we had four inches of ledge, a handhold, and six hundred feet to the névé below. Nearer the summit we played hide and seek among the boulders of its western slope, — a game in which Abbot, by keeping closer to the arête, excelled. We found him finally upon the topmost stone, inspecting therefrom the network of ice walls and crevasses which covers the Asulkan side of the Dome. Rock work is proverbially slow; the hour (4.00) forbade an assault upon that peak, and compelled a diagonal descent to the upper névé of the Lily Glacier. Here, for the first time that day, we roped. The snow was firm, the gradient easy, our gait rapid. In an hour and twenty minutes after leaving the summit of the Rampart, we stood between the dark cliffs which wall the Lily col, and looked upon the southern watershed, a U-shaped snow-field which fed a nameless glacier,[2] flowing into Fish Creek valley. Nine miles away, across the deep gorge of that valley, we caught our first glimpse of the matchless cone of Mt. Purity, around whose base wound the Van Horne Glacier. There too was Sugar Loaf, and half a dozen lesser peaks beyond. More fortunate than Green, we saw them under a cloudless sky, in an atmosphere wonderfully clear.

All rules of mountaineering forbade, but under the shadow of Mt. Castor the morning's wish became a will. The col between that mountain and The Dome was but two hundred feet above us; a way thence up the northwestern arête was perfectly feasible with sufficient time. We would take the time. Mr. Abbot led up the crumbling rock slope to the col, we close behind, all going as fast as the rotten footholds permitted. At the col a surprise awaited us. On the névé snow, just beyond the arête, lay a tiny lake, deepest blue in the centre, shading shoreward to lightest green, a sapphire girt with emerald set in a frozen sea. An arm of the névé rose high up the northern side of Castor; this we preferred to the rocks of the arête, and in zigzags made tolerably good progress. Forced finally to the arête, we found the rocks a veritable stairway, thanks to favorable cleavage planes. We were upon the summit at twenty-five minutes past six.

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[1] Our name for the second summit on the ridge beyond Mt. Afton. It is the next summit northwest of Mt. Castor.

[2] For which we suggest the name of Swanzy Glacier, after the peak around whose eastern base it flows.

I have but a vague recollection of the view. Three things, and three things only, remain clearly in memory, — the snow of Mt. Purity reddened by the setting sun; the long wisps of cloud which floated up eastward over the Illicilliwaet névé; and the twin peak, Pollux, equalling if not slightly exceeding the height of Castor. The peaks were connected by a short sharp ridge about a hundred and fifty feet below their summits. Fifteen minutes more would have given us Pollux; as Abbot remarked some weeks later, we did not have them. Four out of the eight short minutes on the summit were wasted over a diminutive cairn, not, I fear, to be distinguished from the surrounding natural stone heaps. Turning to go, a last look fell upon Mt. Donkin; to my surprise, it barely equalled the point on which we stood.[1]

On returning to the snow-slope we glissaded almost to the col. There two courses were open, — to descend at once eastward to the main stream of the Asulkan Glacier, or, retracing our steps to the névé of the Swanzy Glacier, to make a contour along the Fish Creek slope of our ridge to the head of the Asulkan Pass. The first route involved an immediate descent of fifteen hundred feet through an interminable maze of crevasses, among which, if darkness fell, we might chance to spend the night. The second route, though much longer, promised an easier gradient and quicker progress. Therefore we chose it.[1]

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[1] Our aneroid reading on Mt. Fox in 1893 was 10,200 feet. We then estimated that Mt. Donkin was 600 feet lower, or 9,600 feet. Allowing an aneroid error of 500 feet, this would give an approximate barometric height to both Donkin and Castor of 9,100 feet.

Making a traverse across the lower western face of Castor, we regained the Swanzy névé not far from the foot of Pollux. The névé stretched before us in long undulations that broadened beyond the southern arête of Pollux into a great white field which swept across the now degraded ridge. The sun had set, and the coming twilight tinged the snow a cheerless grayish blue. Down in the Fish Creek cañon it was already dusk. We went rapidly, at times running. Passing Pollux, our course turned sharply to the left, crossing the snow-field on a line midway between that peak and some lower ledges which undoubtedly marked the southern termination of the ridge. It did seem a little queer. We had followed, as nearly as might be, a contour from the Lily col; and yet were not those desolate ledges the top of the cliffs which head the western side of the Asulkan Pass? If they were — In another moment we were looking upon the pass, a thousand feet below (7.30).

"Hobson's choice" has one advantage, — no time is lost in hesitating discussion. The Asulkan valley is here a deep white trough, an imposing central ice-stream fed by snow-covered lateral glaciers. The initial slope of the lateral glacier on which we stood was uninvitingly steep, a thousand feet of such work at night-fall disagreeably interesting. Abbot kept a stiff upper lip, — thanks to the burning sun in our trips upon Hector and Stephen; such manifest superiority surely required recognition by first place upon the rope! Fay was end, I middleman. At our feet a deep ice-gorge broke transversely into the ridge. In full daylight those sea-green glassy walls must have been rarely beautiful; at such an hour it was the coldest, dreariest hole I ever saw. Along the northern lip of this gorge upon which we stood, a thin edge of some otherwise buried cliffs just pierced the ice, — an alternative route which for a little space flanked the precipitous snow-slope. An exciting five minutes followed as we slipped and rattled among those rocks in a breathless race with darkness. Forced again upon the snow, haste was mingled with caution. Below us wide schrunds opened, — the promise, unless securely bridged, of a shivering night huddled upon the snow. To and fro, therefore, along that nervous declivity, in seemingly interminable traverse (at times almost horizontal), we sought safe passage. At last I learned the misery of the middleman when leader quickens and end man slackens pace, — a sudden tightening at the loins, an unsteady lightness in the steps, a trembling suspense lest in lateral balance heels equal head. The slope moderated, thereupon joyously we ran at full speed to the margin of the central stream.

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[1] On Green's map the elevation of the Lily col is given as 7,530 feet, that of the Asulkan Pass as 7,794 feet. It therefore seemed feasible to pass from one to the other by following a contour around the ridge. My only fear at the time was that certain cliffs which I knew to be on the Fish Creek side of the latter pass might force us far down into the valley.

Without pausing we turned diagonally downwards, aiming for an old tree-studded lateral moraine, easily seen from Mt. Abbott. Abbot led as before; Fay "right-angled," now on one side, now on the other, as far out as the rope would allow. Strangely enough, there were few open crevasses. Without further incident, we found our way, with but slight error, to the higher end of the desired moraine. It was now twenty-three minutes past eight, and quite dark.

Looking forward to this hour of our adventure, we had hoped much from Abbot's rubicund countenance, which during the day had glowed before us like a second sun. In vain the hope: under the stars the light of that countenance for a time vanished. Without such aid, as best we might, we stumbled on. Twice dimly discerned snow-patches gave intermittent glissades, — a strange experience thus to fly forward through the well-nigh impenetrable gloom! At the lower end of the moraine, beneath the trees, we went by faith, yet not without occasional slips. Crashing through the underbrush, staggering over rolling stones, we reached the snow-bridge that we knew here spanned the glacial torrent, and, finding it in better condition than we had anticipated, crossed without difficulty.

Here, under ordinary circumstances, this tale should end. A path presumptive led hence, five short miles, to Glacier House. It was now somewhat after nine; by eleven we might hope to make havoc among the provisions in its larder, — thought to make the mouths of three hungry men water. In honor of that home-coming, Abbot divided our sole remaining rations, to each a handful of raisins; a stipend quite insufficient to satisfy a now long-felt want.

Ah me! The uncertainty of human expectations! The path presumptive was by no means a path apparent. Vainly we searched, working more than once from stream-bank to valley-side in a desperate endeavor to find it. Mr. Fay with unabated ardor would have climbed the hill-tops in pursuit. It was abominable going. When we stumbled along the stones of the stream-bed, the alders of the bank seemed much more comfortable; once in the alders, tripping over hidden roots, blinded by flying branches, tangled in the hellebore, the stones offered happier progress. Had Mr. Curtis been with us, he would have forsworn his testimony regarding the density and impenetrability of Selkirk thickets. Once we stumbled upon the path; an empty hope, for we lost it on a sand-spit ere twenty rods were run.[1] Moved beyond speech, we toiled silently on. In the quiet of those hours there came to mind this inspired sentence, now ever memorable: "Night is a perfectly normal part of the twenty-four-hour day, differing from the portion ordinarily devoted to climbing principally in its meagre opportunity for secure and speedy progress," — prophetic words, to whose truth we three bear witness.

A mile above Glacier House we again found the path and kept it. Visions of Curtis with bread and cheese and jam upon the office counter quickened our weary legs. At two in the morning, just before we turned into the broader path leading to the Illicilliwaet Glacier, I heard a voice through the darkness saying, "What a difference time and circumstance make! In daylight that is the most beautiful valley in all this region; at night its dulness and stupidity are simply overwhelming." Profound silence gave unanimous assent.

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[1] We learned the next day that, through disuse and the washing of spring freshets, the upper portion of the Asulkan trail could scarcely be followed even in daylight.

Another Story about Mount Stephen.

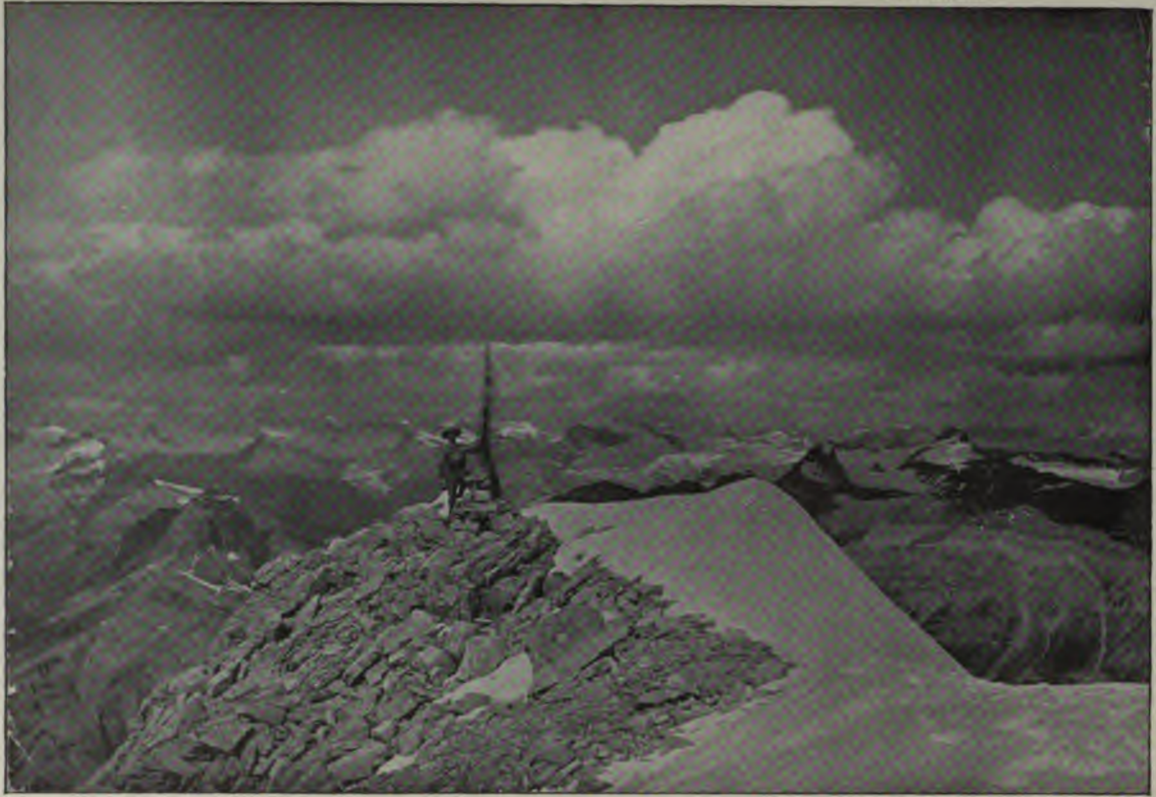
By Charles E. Fay.

Read December 27, 1896.

In a paper recording the story of "A Partial Ascent of Mt. Stephen," printed in the last issue of Appalachia, after telling of a hard day's climb, begun without expectations yet ending in a disappointment, these words occur: "We turned our backs upon Mt. Stephen for the time being." This phrase, while it pledged to nothing, did, it may be confessed, embody a covert threat against a mountain for which we had not the slightest affection. Despite its majestic appearance to the passer-by, Mt. Stephen has no power to win one's regard. He who has set foot upon it knows that its seeming stability is a pretence, and that it is making headlong progress towards that final decay and degradation which is destined to render mountain-climbing a forgotten art not later than the n^{th} century. M. Lapparent, in a paper recently read to the Scientific Congress in Paris, says $n = 49,600$, i. e. 4,500,000 years from now; but you can't really tell. Anyway, this state of things renders Stephen, practically and sentimentally, an odious mountain to climb. Its sole attraction for us lay in the fact that it had foiled us in the moment of promised success. But, my dear fellow-climbers, do you know of one more powerful?

Accordingly, from the moment a Canadian Pacific Excursion was planned, a feeling of exultation pervaded us, as we thought of the three days' tarry at Field. An attack on the Chancellor was among the possibilities; a return to the assault of Mt. Stephen, among the certainties.

Arrived upon the ground, however, we found our little party of high climbers made up with a working majority of those who had no predilections in favor of this enterprise. The fact that its ascent had already been accomplished rendered it but slightly desirable to our most ambitious climber, who panted for a string of scalps that had never lost a hair; but we appealed from Philip intoxicate with *jungfraumilch* to



VIEW NORTHEASTERLY FROM THE SUMMIT OF MT. STEPHEN.

From a photograph by the Topographical Survey of Canada.

Philip sobered by the report that the Government Surveyor had left word, when he came down in 1892, that, unless he was followed very soon, he would be the last man for some centuries to attain the summit, — so swiftly and in such enormous masses is its upper portion falling to ruin. Another argument, weighty with all, turned the balance. No woman had ever stood on Mt. Stephen. Did not Club loyalty — to say nothing of gallantry — demand of us to make an effort at least to put one high summit of the Canadian Rockies under the foot of feminine "Appalachians"? This was surely the most available chance.

Furthermore, it seemed as if the present occasion offered our sole opportunity for a single night's camp for the party as a whole — up in the amphitheatre beyond the high cascade. No one cited the full moon as an added attraction. We had got beyond that, — not the moon, but the argument. This whole excursion had been timed to suit her convenience, and, if you will believe it, although every night was clear, she failed to put in an appearance. The August moon of 1895 is the one of which our party individually and collectively know the least of any moon that has shone since the days when we used to cry for it. Why? Because the mountains, cut through by east and west valleys, are too high, and her southing was at a maximum. I personally recall seeing her but once, skulking across the notch of the Asulkan valley, when I got up at about 2 A. M., to see if it was time to be up to start for Mt. Rogers. No; the moon was not in our plans for a camp in the grand amphitheatre, but such a camp would be a great experience all the same!

The railway people, who had received orders to spare no pains to make our entire trip a success, and who seemed even more ready to do favors than we to ask them, were taken into confidence. As a result, a detachment of section-men, who all that forenoon had been devoting themselves to hand-car pumping and path-clearing down by the Natural Bridge, started in with axes, and in a few hours had cut a trail through steep and disagreeable going for at least a mile, as far as the foot of the long hog-back mentioned in my former paper. If they had only been content to stop with this favor! Their zeal the following day attempted the impossible, and as a result, — allusions to the camp in the amphitheatre are among the chief facetiæ of our summer trip.

Our plan involved a comfortable start of the entire company (excepting two) at 8.30 A. M. Seven of us, including Miss Hopkins and Miss Potter, would forge ahead, attempt the summit, and return as far as the camp to pass the night with our congratulating friends. Excepting as regards the luncheons for the day, which Jonson — a most faithful Swede whom we engaged as a porter — would carry for the larger party, we would accept the generous offer of the railway men, and leave everything, every single thing, including all our heavy blankets and cooking-gear, for them to pack up to the amphitheatre for us, — a journey as unfamiliar to them as that to the North Pole. This they would do after their forenoon's work on the section was done.

According to such a programme began our day's doings for Monday, August 4th. All kept well together during the first hour; then we seven took a faster gait. Before noon we were in the amphitheatre, where we enjoyed our luncheon. Prodigal of what seemed unlimited time, figured upon the basis of the preceding year's experience, we loitered long in this delightful place, wondering which of the several capital spots for camping we should find our party in when we came down. It was 1.15 before we were off again, and, taking a course at first midway between that of our former ascent and our descent, we toiled up the steep southerly side of the promontory which forms the end of the great westerly ridge of Stephen, — its only feasible line of approach. By this route we reached the "stone lawn" at its crest with far less effort than before. By three o'clock we were cautiously making our way up one of the three parallel "V-shaped gorges," which here cut through a thick stratum of the harder rock, and are regular avenues for the descent of noisy avalanches of shale — and other masses not so shaly — from the higher regions. We were glad we had ample time here, although for some reasons it is a good place to hurry in. Beyond it came the long grade up over the angular masses that strew the whole ridge. The exceeding fascination of this whole section may be inferred from the report of a gentleman to whom six hours passed in traversing it seemed but two![1]

Our party above the "V-shaped gorge" followed approximately the course taken by Mr. Curtis and myself, yet keeping finally somewhat more to the left, so that for the last five hundred feet before reaching "the cliffs," the ascent was much steeper, and much of the way up a broad couloir. This required more time, so that it was 4.30 before we arrived at the limit of our last year's climb.

The day was exquisitely clear, and this also had had a tendency to delay us. It was impossible not to linger for backward looks as we rose above the lower ridge and the vast wall of the amphitheatre near at hand; and the view stretched away into a fascinating distance, known to some of us by experience, to others by glowing report. There in the western horizon towered the peaks of the promised land, the Selkirks. In the southwest, much nearer at hand, the ponderous towers of Mt. Goodsir, the right-hand one seeming about to topple like a wounded giant upon its fellow. Far in the hazier south, yet distinctly visible, the soaring outline of what promises to be an "American Matterhorn" worthy of the title,— Mt. Assiniboine. Who will be its Whymper, and when? More easterly, and very near, the peaks of the Great Divide in the neighborhood explored by Mr. S. E. S. Allen; one of these in particular, probably Mr. Allen's "Hungabee," a portentous apparition, likewise seemingly inaccessible. Each of the peaks I have called by name, and others almost as bold, await their vanquishers; and he who conquers them will deserve membership in the most select of alpine associations. Not form alone, but exquisite coloring, particularly that of the late afternoon sky, rendered the picture the loveliest, if not the grandest, that we looked upon during our absence.

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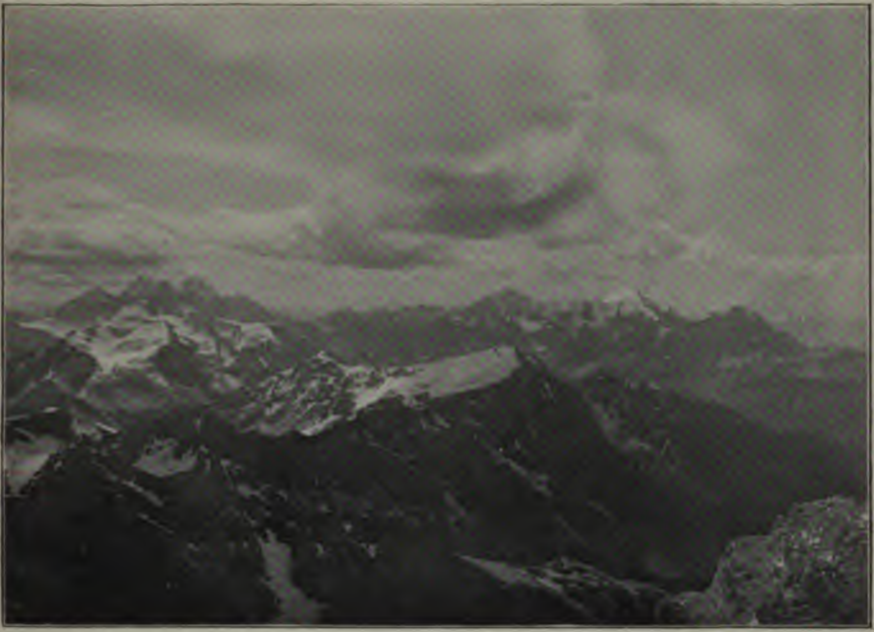
[1] "Mr. Paul Greer ascended Mt. Stephen as far as the cliffs of your later experience, June 4, before your August climb. His train was caught by the washout, and stalled at Field for two weeks. On the day mentioned he and a chance acquaintance decided to attempt Stephen. They took the route you and C. followed later, and on the steep pitch, just below the "stone lawn," the heart of his companion failed. Greer determined to go on. At 8 he was on the "stone lawn," and *in what seemed about two hours* he was facing some cliffs beyond which he could not advance. *To his surprise it was* 9.15 P. M. Seeing that he would have to pass the night here, he worked over to the left of the cliffs, and attempted to signal Field by burning his handkerchief. He found a tilted stone, and crawled thereunder for the night. Being subject to sleep-walking, he did not dare to sleep, and lay awake until 4, when he made his way down to Field. I understand that he managed to work up a little way on the left flank of the cliffs, and left his staff with white rag thereon, visible from Field on his return." (Letter from C. S. THOMPSON.)

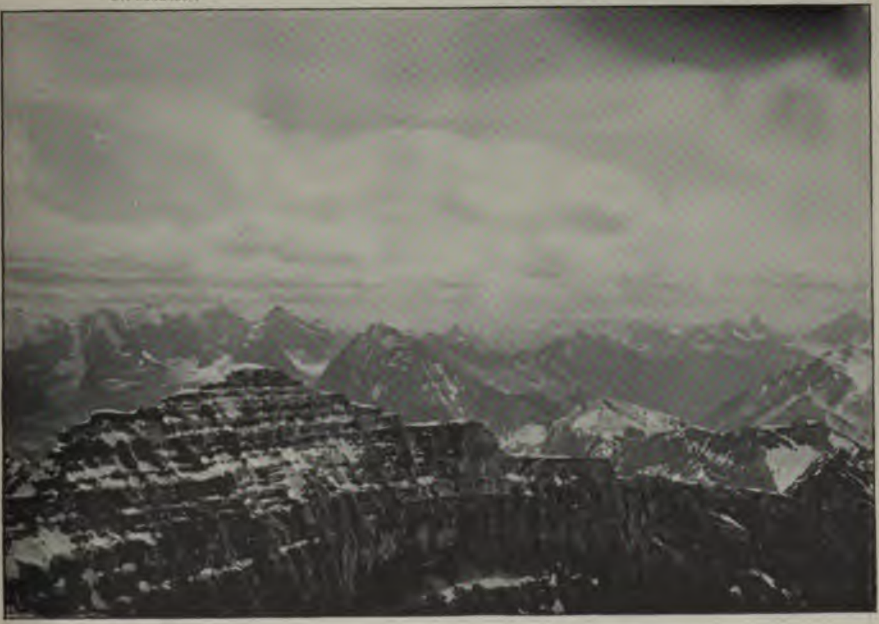
It was upon this that the eyes of our delighted ladies and their appointed escort rested while the problem of farther ascent was being studied. A glance at the snow couloir that had estopped us last year showed it a possible way for a party properly equipped, and with ample time even for ladies. We found it feasible, however, to force a passage up the broken face of rocks to the left of it. After a quarter of an hour's slow progress, we became convinced that to get our ladies to the top of Stephen that day was impossible, and this doleful news was sent below over the inhospitable crags that now lay between us. They, with Mr. Curtis, would make a leisurely return to camp, and we four — Messrs. Abbot, Field, Thompson, and myself — would push on in hopes to reach the summit.

My last year's estimate of the probable height of the summit above the cliffs was about 350 feet. Though I have meantime had access to Surveyor McArthur's reports[1] and his implied much larger estimate, I still regard that figure as not greatly out of the way; possibly it may be 400 feet. The time that would be taken to cover it I decidedly underestimated, — for such a 400 feet! Much of it was crag-work for both hands and many a rope-tug. When about half way up, we came to a point where the arête is broken by a notch, perhaps twenty feet in depth below its westerly crag, and rising some thirty feet higher on the side towards the summit. This was at the apex of a re-entrant angle, the gully that held the snow-couloir. At the first glance the eastern wall seemed impregnable; but we soon discovered, reaching horizontally to the right from near the bottom of the notch, a shelf, perhaps a foot in width at its best, and, slanting upward from a point some fifty feet out upon it, a rift with fractured sides, whose length did not surpass that of our rope. All of our ice-

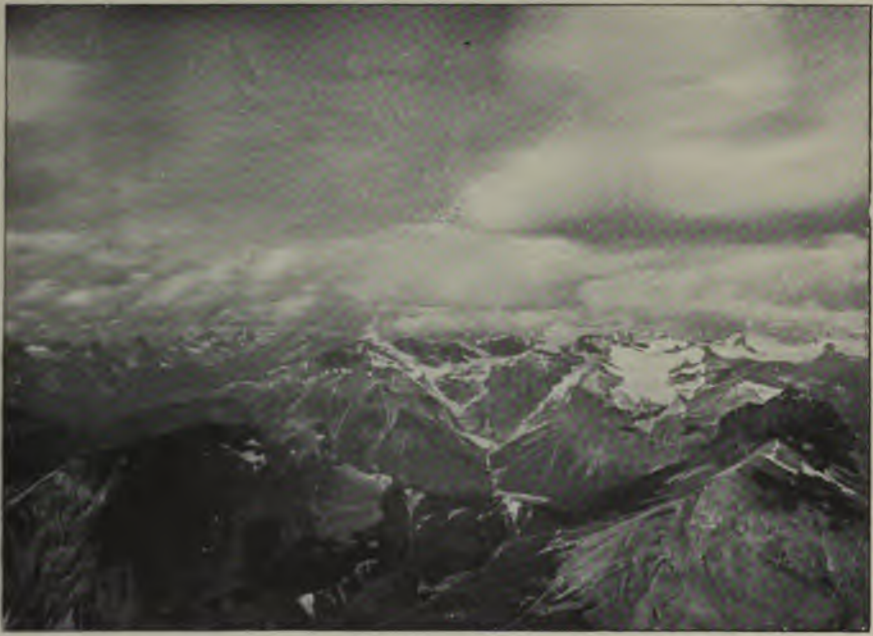
[1] Appended to this article.



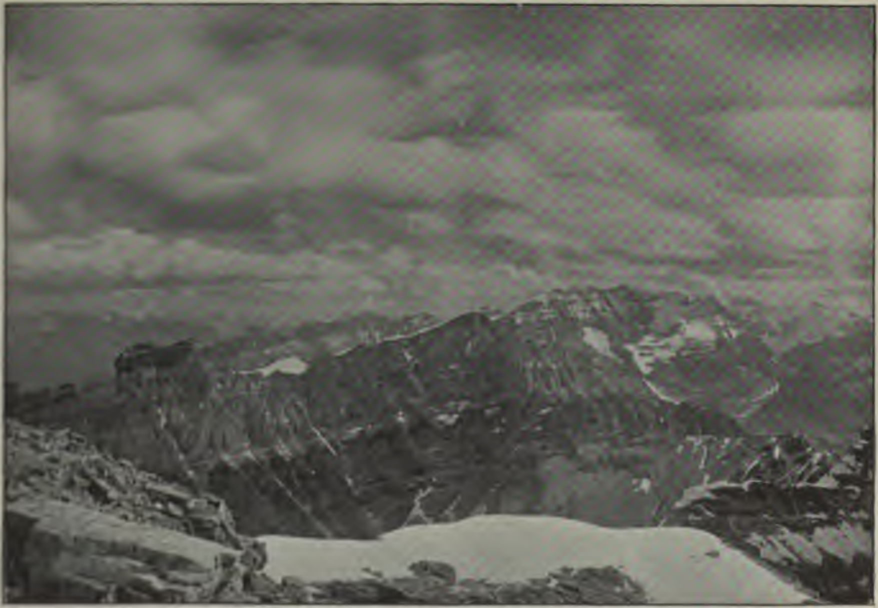
VIEW SOUTHWESTERLY FROM THE SUMMIT OF MT. STEPHEN.



VIEW SOUTHERLY FROM THE SUMMIT OF MT. STEPHEN.
From photographs by the Topographical Survey of Canada.



VIEW NORTHERLY FROM THE SUMMIT OF MT. STEPHEN.



VIEW SOUTHEASTERLY FROM THE SUMMIT OF MT. STEPHEN.

From photographs by the Canadian Topographical Survey.

axes but one left behind us, we sidled out to this point, and our leader proceeded to test the passage. We had him safely at the rope's end, the other being made fast to a rock. The worst he could do would be to clutter down to the upper snow of the couloir, a few feet below where we stood, — an ugly fall, to be sure, but nothing compared with the possibilities for the unattached. With intense interest we watched his progress to the next good anchorage, to which we followed. A repetition of this programme placed this most serious obstacle behind us.

From here on, the way was not steep, but demanded great caution. In general, we kept somewhat below the actual crest, and much of the distance with our feet in snow and our hand-holds upon rock. It is hardly necessary to say, for the benefit of later comers, that we were on the south side of the arête. The north side is a savage precipice of two to three thousand feet. In one or two places we came to the crest at points where the narrow snow-bands swept up to it. At these points the ice-axe, having served the leader, was left to give similar aid to each in turn.

At 6.45 we stood beside the monumental cairn built by the Government Surveyor in 1887. Where it stands is doubtless the highest point of the mountain, but it is not the pleasantest spot for a party of four to rest. Snow was piled upon its southern side. The cairn itself takes up most of the width of the crest at this point, at least beyond the snow. Less than a yard of bare rock intervenes between it and the precipice. Over on to this we had now come. A few rods beyond there is a broad space much more inviting, with a secondary cairn upon which Surveyor McArthur had planted his flag. Thither we decided to go. It is the general opinion of our company that the brief passage to that point was the most sensational event of the day. Rock and drifted snow, probably the face from which a cornice has broken, contend for the possession of the narrow crest. That ice-axe must have known by our hand pressure how much we loved it; our rope, let out an inch at a time, must have felt that for reasons best known to ourselves we liked to hang on to it. Not one of us needs be appealed to for a description of the view from Mt. Stephen's summit. For this we refer you to the superb panorama made by the Government Survey. When, however, an introspective camera is invented for snap shots at what is left in the imagination, it will be able, if turned in upon any one of us, to catch in sharp outlines the view we had between our feet as we stepped across a certain angle, from rock to snow.

It was now after seven o'clock, and we had agreed to pass part of the night at least, with our friends below. The sun was still high, but we must be off. The return to the base of the cliffs was easier, but for the greater part of the way not much more rapid. It was nearly nine o'clock before we left them behind us. Ten o'clock found us still enjoying the prolonged twilight,[1] which lasted nearly down to the upper end of the gorges. Even after it had faded, the sky reflected enough of the rays of the risen, yet hidden, moon faintly to illumine our pale footing. The passage down the darkened gorge was a somewhat weird experience, as each had to take it alone, while those remaining at the upper end sat mouse-still, lest they should start some unstable stone only waiting like a villanous bull-dog to be set on to do an injury. From its lower end we made rapid progress, for the way is free of impediments, and by 10.30 we landed on the floor of the amphitheatre.

But no camp-fire lighted it; no merry voices greeted us. The sweet hush of night was broken only by the laugh of the stream near at hand, and the muffled roar of the cascades below. But disappointment had been discounted. From high up on the ridge we had seen a fire-light a half mile or more lower down in the ravine, at about the level of the fossil-beds. Onward, therefore, to this changed tryst; but at a slow gait, for now the way, beside being very steep, was largely in timber and undergrowth. In due time we came in sight of our camp-fire, made to flash more brightly after our approaching calls, sounding above the rush of the waters, had been heard by those about it, and just at midnight we were receiving the congratulations not of a party of fifteen but of five, — our two ladies and Mr. Curtis, Mr. Ladd, and the Swedish porter.

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[1] The seeming discrepancy between this statement and those of Mr. Thompson's paper is due to the fact that the two excursions were made in regions adjacent, but in different time-belts; and in this instance we were high up on the western slope of a mountain, in the other we were in a valley.

All were in the gayest of spirits. Though this bivouac was in no ideal spot, such as Fancy had painted for our more elaborate camp, there was space free of burnt stumps large enough to lie down in, and no lack of blankets to put under and pull over, and provisions galore. Hitherto and no farther had our over-confident section-men been able to pack the heavy material. The party, after awaiting them in vain in fairer scenes, had started down, and, being unable to bring their minds to passing the night in this comparatively cheerless spot, had preferred to return to Field under the guidance of our Councillor of Art. It is confidently expected that the Club's pictorial collection will be enriched with a charcoal sketch of the lower portion of the trail, and particularly of the tangle in the timber where the old trail and the new "fault," as the geologists say.

I shall not linger upon the story of how we passed the few hours that intervened before our early start, and of our descent with the camp equipage to Field. Merely a word as to the first of those hours. Thackeray's familiar line —

"Went on cutting bread and butter"

(if only the exigencies of the metre would admit of "jam" or "marmalade" in place of "butter") — characterized the unremitting employ of our ladies until 1.30. Eating was interrupted only to tell a story, interject a witticism, or to burst into a general laugh. And yet before we slept, one of our number, whom I had seldom seen in livelier spirits, told me briefly of a serious temporary illness suffered that day, — the most serious of many such attacks experienced by him during a period of several years.

Pardon me, then, if with a suddenness equal to that of life's changeful experiences, I pass to a graver key. This was our friend Mr. Ladd's last climb of any considerable length. Not but that his condition was as good after it as before, but the Selkirks, towards which we sped immediately upon our descent from camp, is a less favorable region for extended climbs for one compelled to exercise caution. The stay here, the continuation of our trip to the Pacific coast, our return with its varied and delightful experiences, he greatly enjoyed. He reached Boston in general far less weary than when he started, a few days later declared himself never better in his life, yet within a week he was no more.

I cannot permit this occasion to pass without a word of tribute to the memory of one who for sixteen years was a conspicuous member of this Club. In this presence the attribute that calls for particular emphasis was his genuine love of Nature. With Mr. Ladd it was no fiction, no affectation; it was almost a religion, entering into his life as a man and as a teacher.

He loved Nature in her simpler aspects even more, I think, than in her grander ones. He was ever loyal to the form in which she had appealed to him in his boyhood's home. The lake region of New Hampshire and the Sandwich range were dear to him beyond expression. Chocorua was his ideal mountain, and to ascend it he would at any time forget his more than threescore years, and take his way bareheaded up through the fragrant woods, and over the ledges, at his own deliberate pace, as if his feet loved to linger on the moss-bedded oxalis and mitchella, the moist humus and the lichened granite. Flowers he worshipped with an almost feminine passion. Amid the stupendous scenery that was a new revelation to the last weeks of his life, the half-strange, half-familiar flora was a principal source of delight. Amid this scenery, which his pronounced patriotism found pleasure in comparing with that of Switzerland, he did not scruple to name his favorite peak in far New Hampshire, and to declare that his admiration of these glacier-robed giants could not eclipse his love for Chocorua.

Whatever he regarded as the chief enrichments of human living was likely to find embodiment in the institutions of his school. The 10th of October, which his long observation had led him to recognize as the date when New Hampshire maples put on their most splendid colors, was the signal for an autumn holiday at "Chauncy."

Mr. Ladd joined this Club in 1879. He was always one of its most loyal and devoted members, a frequent attendant upon its meetings, and often seen upon its outings and excursions. He always thought less of what the Club could do for him than of what he could do for it, for he believed in it as an agency of widespread good. Though he never held office himself, the recognition of his deep interest and good judgment, and his wide acquaintance among the membership led to his appointment, on more than one occasion, upon the committee to nominate its officers. He will long be missed by those who were for so many years his associates here, and by none more than those who enjoyed his companionship upon the Selkirk excursion of 1895.

In order to make the annals of Mt. Stephen as complete as possible, I append Mr. McArthur's two official reports to the Surveyor-General of the Topographical Survey of Canada.

From Report for the Year 1887.

. . . While awaiting the arrival of the man with pack-horses, I made the ascent of Mount Stephen. We started from camp at 4.30 o'clock on the morning of 9th September, 1887, and had mounted a considerable distance through the bush before daylight, and at 8.30 o'clock we reached timber line. We concluded to attempt the blade-like ridge which I have mentioned in the account of my previous reconnoitring trip. The slope leading to the top of this ridge was very steep and covered with slaty *débris* which carried us back at every step, rendering our progress slow and toilsome; and an attempt to sit down generally resulted in being carried, with an avalanche of shale, a considerable distance before we could arrest ourselves. After about an hour and a half of hard work, we reached the top of the ridge, up which our way led. We had now to travel at right angles to the course we had taken to reach this point. Viewing the sharp, broken declivities up which we would have to climb before we should reach the turret-shaped cliffs at the top, we began to realize the dangers and difficulties of the task before us. Resting frequently and reserving our energies for the trials ahead, we toiled perseveringly upwards. Perpendicular walls, sometimes more than two hundred feet high, often rose before us, the only possible way up which lay through the sharp V-shaped gorges, broken by short precipices. In these places we had to keep close together and exercise great care, as the displacing of one stone caused a perfect avalanche of rock and gravel. After climbing seven hours, we reached the base of the turret. We started up a steep V-shaped gorge, and progress was sometimes not much greater than if on a treadmill, and the sliding gravel set in motion by our feet poured with a continuous roar over the short precipices below. After ascending about seven hundred feet in this tiresome manner, we reached the top of the ravine, and a perpendicular wall several hundred feet high rose before us. Inscribed on the rock were three names, Hill, Whatley, Ross, 6th September, 1886. In a crevice of the rock we found the box of lampblack and the brush with which the names had been written. Taking these articles along, we set out to discover a route to the top. A steep narrow gorge, with precipitous sides, descended from the summit and at right angles to the direction of the ridge. From this an ice stream emerged and continued down the mountain-side. After hunting around fully a half hour and studying the situation, we decided on ascending this ice-slide for about one hundred feet to a point where we could find footing on the cliffs above. Foot by foot we worked our way, cutting steps with our alpenstocks, and in time reached the ledge of rock and looked back down the perilous slope. A slip on this glare surface meant death, and how we were to get down again caused us no little anxiety. Crawling along dangerous ledges and up steep narrow gorges, we poked our way, expecting at every turn that one of the perpendicular walls would finally stop us with its impassable front. At last we reached the top of what we had judged from below to be the highest point of the mountain. We were not a little disheartened to see looming ahead of us another wall several hundred feet high. We moved along the broken ridge, and when almost at the foot of the wall we came to a deep chasm, which was the top of the ice gorge up which we had already cut our way. The distance across was about three feet, and immediately opposite rose the perpendicular face from a narrow ledge. Leaving our alpenstocks behind, we stepped across and with face to the wall moved along the ledge to a slanting rift, up which we clambered, our entire weight sometimes dependent on the first joints of our fingers. After a perilous climb of about one hundred feet, we reached a *débris*-covered slope leading to the top of the ridge. Our exultation was considerably lessened by the fact that the smoke which had been rising all day had now almost reached our level. The top of this ridge was like a much broken wall, in some places not more than three feet wide and descending in perpendicular sides, sometimes forty feet, to the steep slopes of the ridge. It required all our nerve to crawl about one-eighth of a mile along on the top of those half-balanced masses to the highest point on Mount Stephen, 6,385 feet above the railway track.

The air was perfectly still and the smoke had just reached our level, shutting out everything below. It appeared like the surface of an ocean, the protruding peaks of the higher mountains resembling islands, or rather immense icebergs. I was able to get but twelve readings from this station, and the smoke prevented the taking of views. We erected a cairn about nine feet in height and about three feet in diameter at the base, on which we inscribed our mission, names and date. We remained on the summit about an hour, and then started back along the broken wall and reached the point of descent to the chasm on the other side of which we had left our alpenstocks. We backed down to the edge of the rift up which we had made the ascent, and with our faces to the rock and studying every move, sometimes clinging with our fingers in the shallow crevices searching for toe-holds, we worked our way down the slope and reached the narrow ledge, along which we moved sideways with our backs to the gorge until we came to the narrow part of the chasm, which we crossed in safety. Regaining our alpenstocks, we continued, looking forward to our descent of the icy slope with some anxiety. After a fruitless search for some other route down the precipitous mountain face, we approached the ice gorge. We placed our alpenstocks across our shoulders under our pack straps, and with our faces to the slope, and fingers and toes in the steps, we slowly backed down and regained the base of the cliffs. All the great dangers of the descent were now passed, and it was with a peculiar feeling of exultation that we retraced our way down the steep V-shaped gorges. The descent of these places which had caused us so much labor to ascend was comparatively easy and rapid. Leaning well back on our alpenstocks, we were sometimes carried quite a distance by the coarse gravel slides, and only left them to climb down the short precipices over which they poured. The descent of the shaly slope leading from timber line up to the blade-like ridge was also greatly accelerated by the assistance of the stocks which enabled us to slide for long distances with the slaty *débris*, and we only stopped to gather fossils, of which we found a number. We made the descent from timber line in an hour and a half, and reached camp at 7.30 P. M., after an absence of fifteen hours, nine of which had been occupied in the ascent which was the most dangerous that we have accomplished, although not the most laborious. . . .

This ascent and descent upon the snow of the couloir with no better reliance than alpenstocks seems fully as perilous to one who has seen the spot as it did to those who performed the feat. The risk taken was very great. Even with our ice-axes, as I have said, we preferred to keep off from it.

From Report for the Year 1892.

. . . I had to re-occupy my station on Mount Stephen, where I had erected a signal in 1887, and therefore, after making another ascent to the east of the pass, we started for Field, which place we reached on the 25th [August], and camped in the small prairie at the foot of the river flat.

Owing to unfavorable weather, we did not begin the ascent until the afternoon of the 30th. In 1887 we made the ascent and descent in the same day, but on this occasion I decided to make a camp near timber line. After dinner, accompanied by two men and two pack-horses, I started up the mountain side; and as the weather appeared very unsettled, we took sufficient provisions to serve a few days. There was no trail, and we were obliged to chop our way through. Some of the pitches were very steep, and one pony became exhausted when we were about two thousand feet above the valley. We unpacked his load and divided it between us, and continued the ascent.

We camped a few hundred feet below timber limit near a small creek, and were fortunate in finding a patch of feed for our pony. The slope was about 30°, but brush was plentiful, and we managed to build a comfortable camp against some trees. We were more than 7,000 feet above the sea. It froze quite hard during the night, and in the morning the sky was overcast and a cold wind was blowing from the west. It looked very much like rain or snow, and we hesitated about starting, but at length decided to climb as high as the cliffs, and if the weather should not become more favorable, to cache our instruments and return to camp.

Accompanied by my assistant, I started at seven o'clock, following the same route as in 1887, which is the only possible one to take.

I had borrowed a flag from a hotel man at Field, to plant on the summit, and we carried a dry pine pole about fifteen feet in length to serve as a staff. As the morning advanced, the sky became brighter, and we had a few flurries of snow; but by the time we reached the cliffs, at ten o'clock, the sun was breaking through the clouds.

We were now about two thousand feet from the top, and every step was fraught with danger. Keeping close together, we started up the V-shaped gorge, at almost every move displacing loose rock which rolled with a roar over the precipices.

I had no difficulty in following my former track until we came to the second stage of cliffs, to surmount which in 1887 we had to cut our way up a steep incline of ice which filled a deep fissure. To my surprise the face of the mountain has greatly changed since then, as fully 200,000 cubic feet of rock which formed the western wall of this fissure had been displaced and fallen into the amphitheatre below. We were consequently not compelled to climb any ice, and without difficulty reached the top of the gorge, where we left our alpenstocks. The ridge must be at least twenty feet lower than at the time of my former visit, and where at that time we had but to step across a narrow chasm on to a ledge, we had now to reach the ledge up an almost perpendicular wall, and it seemed at one time that we were to be balked; but with the help of my assistant and the long flag-pole I managed to surmount it, and then pulled my assistant up with the rope.

About 500 feet more of steep, dangerous climbing brought us to the top of the cliffs, and we could see our cairn on the summit. It was only a few hundred yards distant, but to reach it we had to pass over some of the most dangerous places in the ascent. The ridge narrows and forms a broken wall, in places not more than three feet wide and with many deep gaps. The north side is a sheer precipice of 2,000 feet, and to the south is an immense amphitheatre, the sides of which are a succession of precipices divided by narrow ledges narrowing down to the timber line. This wall was quite rotten; we had therefore to use great precaution, as the displacement of one stone might cause a large section to fall; we also made use of the rope when crossing the dangerous gaps. We reached the top at 12.15, about seven hours from the timber limit.

On the occasion of my former visit the dense smoke had risen to our level, shutting out everything below. Then the view appeared like the surface of an ocean, the protruding peaks of the higher mountains resembling islands, or rather immense icebergs floating on its bosom; but now it was one of great magnificence of mountain, glacier, verdure, and cloud. We were 6,375 feet above the valley, and 10,425 feet above sea-level, and an aeronaut sailing overhead would scarcely have a more complete view. Away to the southwest we could see the Selkirk Mountains peering over the intervening ranges, the pale blue snow-capped peaks hardly distinguishable from the clouds. To the north across the North Fork Cañon lay the immense snow-field which marks the summit of the Rockies, the only evidence of the submerged mountain-range being the ridges and needles, partly snow-clad, which break out here and there as if struggling to free themselves from its icy embrace.

Sweeping round to the northwest, an unbroken sea of peaks meets the eye, which seem to be piled tier upon tier to the cloud-hooded summits of the distant range which bounds our view. Looking down, we could see the town of Field, almost as in a plan, — hotels, grounds, cottages, and river flat; the railway meandering to the southwest appeared like a sand-colored ribbon thrown carelessly across the landscape.

When we were here in 1887, there was no snow whatever, but now a bank many feet thick crowned the summit; not a stone of our cairn was disturbed, and the inscriptions appeared as fresh as when written five years before.

Looking down towards Kicking Horse Lake, we saw a freight train coming down the big hill, but the only sound which reached us was the signal for the safety switches. We watched it move slowly and silently around the curves until it disappeared seemingly into the very heart of the mountain on which we stood.

While I was busy with the transit, my assistant planted the flag, a St. George's cross, 3′ × 10′, in position where it could be distinctly seen from Field. I took two photographs of it floating in the breeze. I regard this as the highest point in America on which a British flag has been planted.

Our observations were completed and views taken by 2.30 P. M., and with a last lingering look around we started back. The descent to the foot of the cliffs was fully as slow as the ascent had been, and, if anything, more dangerous, but from thence to timber line we travelled rapidly. We reached our camp at 5 P. M., and decided, after having been refreshed with a hearty meal, not to pass another night on the mountain; so we packed everything but our instruments on the pony, and started for the main camp, which we reached about one hour after dark. On the way we picked up our other pony which we had left tied to a tree where he gave out the evening before; judging from the lively manner in which he came down the mountain, the enforced fast seemed to have done him good. Some of the party went into Field next morning, and pointed out the flag floating over the summit, which was visible to the naked eye, and was an object of great interest to tourists and others. It was still waving when we started across the summit on 17th October. . . .

Mt. Goddard and its Vicinity—in the High Sierra of California.

By Theodore S. Solomons.

Read January 8, 1896.

It is not without some sense of humiliation that a native and resident of California is obliged, even by implication, to refer to the unpardonable indifference with which that State has neglected the survey of the Sierra Nevada Mountains. Yet it is impossible to avoid that implication in an article narrative of the journey in those mountains of private persons fitted out with barometer and compass. It may be said that in time the United States Geological Survey will map and describe this portion of the country; but that a Commonwealth at once so populous and prosperous as that of California should for nearly half a century trust to the delay and uncertainty of the National Survey to publish to itself and to the world the story of another Alps, is to convict it of something very like a public crime.

In the just arraignment of California for this offence one mitigating circumstance is, however, to be noted. In the childhood of the State, the Legislature of 1862 directed the organization of the Geological Survey of California, and appointed as its chief Josiah Dwight Whitney, who, in full cognizance of the popular clamor to be told by science where mammon lurked, went systematically to work to describe the whole territory comprised within the boundaries of the

State, and without entire disregard of such unmerchantable resources as beauty, grandeur, and sublimity. The result was that before the niggardliness of a succeeding Legislature had routed the Survey, and drove Professor Whitney eastward in profound disgust, a considerable portion of the more accessible regions of the High Sierra had hastily been examined; and to-day all that is extant in map or book descriptive of the locality which it is my purpose here briefly to describe is to be found in the unfinished annals of the State Geological Survey published a quarter of a century ago. Those few volumes are now out of print. The younger generation has not read them, the older has mostly forgotten what it read; and less is known at the present time of the California Alps by the people who live within sight of them than was known twenty-five years ago. The *raison d'être* of the Sierra Club, then, is obvious; nor in future will it lie in the mouth of a sluggard people, who may possibly awaken some day to map-making and trail-building, to tell that Club that its members have erred in their altitudes or blundered in their meanderings. Our work is necessarily erratic; and its results, so far as our maps are concerned, temporary and makeshift.

The twelfth day of last July found the writer and his companion, Mr. Ernest C. Bonner, engaged in emptying cereals into canvas bags, trimming chunks of ham, compressing dried fruit into small compass, and other like labors. The rather unusual scene of these prosaic occupations was the polished floor over which, in bygone ages, the great glacier of the South Fork of the San Joaquin — in size and importance the second river in California — slid silently, resistlessly, titanically. Its puny successor, the present South Fork, now swirled madly by, in its narrow, throat-like channel, cut in the solid granite. The picturesque sheep-bridge, constructed of slender tamarack trunks, which spans the river here, is called Jackass Bridge, and the succession of flats just below are correspondingly the Jackass Meadows. They are nearly eight thousand feet above the sea.

A two-weeks course of training, during which Bonner and I and our sober old pack-mule had explored many an alpine recess and climbed many a peak at the head of South

Fork streams, had so strengthened our muscles and lungs that when we had completed our preparations and arose with our knapsacks on our backs, the one hundred and twenty pounds they weighed together seemed not half so much of a burden as our sceptical friends had predicted on our departure from San Francisco. In truth, however, we were not lightly loaded; but there was no alternative.

During two previous summers I had forced my way south from the Yosemite Valley, bound to worry out somehow, somewhere, a high mountain route connecting that valley with its twin in grandeur, the King's River Cañon, nearly a hundred miles away. Between lies the larger part of the Southern High Sierra, an uplift of alpine crest, the loftiest, wildest, and most rugged within the boundaries of the United States, and that takes rank scenically among the few most magnificent mountain masses on the globe. When within twenty miles of the head of the South Fork and forty of my final goal, snow and ice, gorges and frowning pinnacle-crowned cliffs, had defied me, until, lingering obstinately among them, a late autumn storm of unprecedented violence had driven me and my then companion to the lower mountains, glad for mere life on any terms of failure. Pondering the matter during the winter, it occurred to me that I could do more toward finding passes over those walls if I were to go on foot instead of trying to lead animals; and accordingly the following summer we prepared for a knapsack trip.

After our course of hardening (which was not without the additional fruit represented by the exploration and mapping of an important portion of the crest), we resigned our mule, surplus outfit, and a number of exposed but undeveloped photographic plates to a sheep-herder, who subsequently conveyed them for us to the settlements, and incidentally subjected the plates to such further and less judicious exposure as to fog them completely. I shall always maintain that in disregarding my humble entreaties not to open that box, the stony-hearted fellow merited more condign punishment than that of his disappointment at finding the pictures quite invisible.

While a smaller quantity of provisions than we took would have been sufficient for a direct journey from our starting-point to the King's River Cañon, it would have been impossible to make side trips, and otherwise to provide against delays in discovering the route sought. Our knapsacks, which were of stout canvas and home-made, contained sleeping-bags formed by doubling eider-down quilts, and weighing four pounds apiece; light cooking-utensils; emergency remedies, including kola-nuts and a few strong antiseptics; 4 × 5 Poco camera, tripod, and five dozen glass plates; a small aneroid, compasses and level; lines and hooks; two Sierra Club register-cans; straps, buckskin, et cetera; socks and one "sweater;" and a little over sixty pounds of food, consisting of ham, canned salmon and corned-beef, flour, white corn-meal, oatmeal and hominy, dried apricots, prunes and apples, raisins, coffee, sugar, chocolate, condensed milk, butter, salt, and baking-powder.[1] Each of us wore a felt hat, overalls, woollen under and over shirt, and the very stoutest shoes with slightly projecting hob-nailed soles.

The region we were about to explore, like many other portions of the High Sierra, was represented on the map of the county in which it lies, partly by blank spaces and partly by townships drawn in such a way as to indicate to one made wise by bitter experience that the topography thus indicated was mythical, and the purported survey of the Land Office fictitious and fraudulent. This proved to be the case. The only other source of information was the atlas-sheet of the old Geological Survey of California, on which, however, only a rough sketch of the topography was to be found. This represented Mt. Goddard as situated on the northern wall of the cañon of the South Fork of the San Joaquin, which, sweeping by it, headed on the main crest of the range some six miles east of the peak. This, with the addition of tributary streams whose graceful curves and perfect regularity suggested "conventional" detail, constituted the only data by which we were to be guided on our travels.

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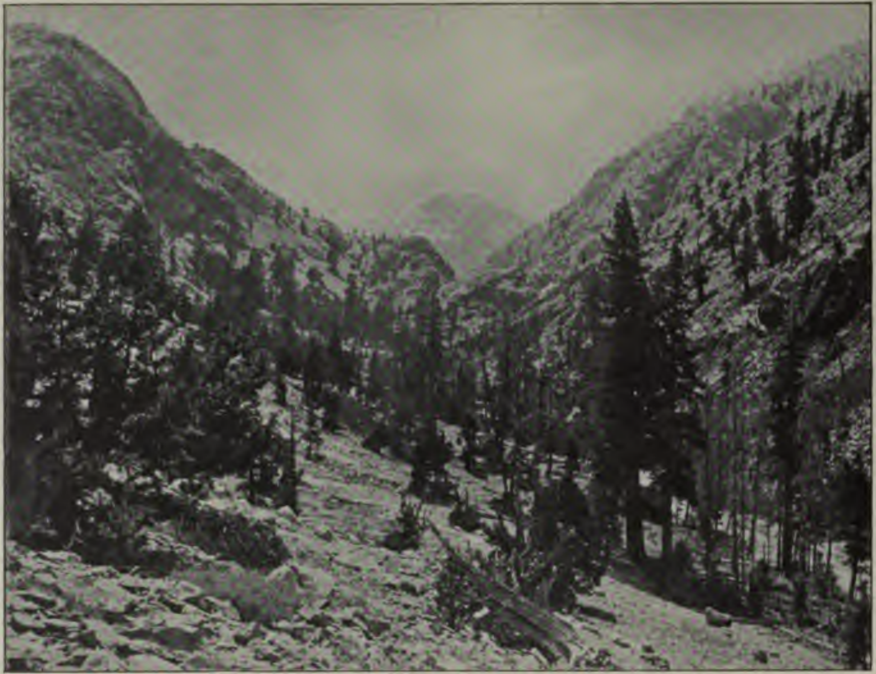
[1] I have found that such foods as condensed milk and butter, by imparting a greater palatibility and zest to the plainer foods, insures better digestion and assimilation of the latter, and so more than compensates for their extra weight.



CAÑON OF THE SOUTH FORK OF SAN JOAQUIN RIVER (8,600 feet).
From a photograph by Theodore S. Solomons.

The sheep-herding fraternity, to whose unloving care the groves and meadows of the High Sierra have for many years been given over, have made rude trails to their principal pasture-grounds; and it was into one of these uncertain paths that we soon fell as we threaded the uneven bottom of the South Fork Cañon. The first day out we made some seven miles in the morning, and devoted the afternoon to lazing in a hospitable sheep-camp and trying to translate into terms of topography the descriptions of our densely ignorant host, "a Portoogee," who, as we expected, could speak only the language of grass. He did know Mt. Goddard, though, and assured me it lay on the northern side of the cañon and at its very head, whereat I was rude enough to smile.

During the second day we crossed a large northern tributary of the South Fork which entered the cañon by means of a deep gorge through which it rushed in foaming rapids (elevation 8,400 feet). Nowhere Yosemite-like in character, the walls of the South Fork Cañon, nevertheless, are lofty and rugged, and the rock of peculiarly striking colors. This is due to the fact that the rocks composing this portion of the slope of the Sierra are metamorphic slates, and also of volcanic materials. Nor was the granite again encountered until we ascended out of the cañon to the valley of the Middle Fork. This stream, which also enters the cañon from the north, we reached toward evening, after having travelled that day something like fourteen miles (elevation 8,700 feet).

Judging the entering stream to carry a larger volume of water than the stream in the cañon itself, we resolved to explore it. Accordingly next morning we cached all but three days' provisions, and, our knapsacks thus lightened, climbed the gorge of the big tributary. Gaining a point from which the stream suddenly became visible throughout its entire descent, we paused as though petrified. Swelled by the fast melting snows of its high sources, its volume that of a small river, the stream hurled itself with torrential force over a series of falls and cascades the most striking and magnificent I have yet encountered in the Sierra, excepting only those of the Tuolumne Cañon. If the whole course of descent of the Middle Fork, from the valley above to the cañon beneath, which must be nearly a third of a mile, could be divided into so many separate falls and cataracts, these would number at least a score and represent all the various shapes and forms assumed by falling water. The grandeur of the picture of which the uppermost of these falls form the central feature is greatly enhanced by the blending with the dark slate of the now reappeared granite, and also by the presence in the right background of a massive rock which rears its head at the angle formed by the cañon and gorge. This rock, which we have called Emerald Point, is of a bright green color, and, I take it, is similar in composition to other masses of like colored rock which are composed of a highly metamorphosed sandstone.

Surmounting the falls, a spacious valley delighted our eyes. In a plushy meadow the river swam lazily as though unsuspectingly to the brink of its plunge. On either side an alpine forest formed groves, which clothed the lower and gentler slopes of the valley, and climbed the steeper sides with picturesque irregularity. This valley I account one of the fairest paradises of the nowhere unlovely western slope of the Sierra; and the State is to be congratulated that the difficulty of its approach has saved it from any serious hurt by sheep and sheep-herders. In altitude its lower end is about 9,200 feet, its upper a little over ten thousand. Threading the meadows and woods with a buoyant step, we reached the head of the valley in a few hours, and, ascending its rather steep northern side, attained a commanding position. From its highest fountains to the cañon brink whence its collected waters are precipitated into the main river, the whole Middle Fork was spread out before us in the greatest detail. The valley of this stream ran east and west. On its southern rim, and near its head, a colossal, sugarloaf-shaped buttress of fractured granite stood sharply up, the advance guard of the host of peaks presently to be described, yet so conspicuously separated from them as to suggest the name The Hermit. The head of the valley was formed of an abrupt, semicircular wall over which two streams poured in thunderous cascade. The smaller of these emerged from a snow-choked, rounded, trough-like basin, which reached back due south a distance of five miles, where it widened at the base of a line of jet black peaks, whose northern faces formed a continuous wall, against which was piled a great mass of snow and probably ice, for the central portion of this belt is undoubtedly glacial in character. Above this central and most extensive ice body, the wall rose as a fine pyramidal peak, which, though we could only suspect it at that time, was afterwards determined to be Mt. Goddard. The larger stream, or main Middle Fork, came over the end wall of the valley in broad, ribbon-like cascades; and a mile below another stream, draining a very elevated snow basin on the north, coursed down the valley's side — here not so steep — in seven or eight distinct branches unconfined by any definite channel.

Above the ribbon-like cascades, which have a fall of about six hundred feet, the Middle Fork drains an alpine area of surpassing grandeur. A few stunted tamaracks (*Pinus contorta*), scarcely to be discerned in a general view, are the sole remnants of vegetable life, save only the alpine grasses; and the stern landscape is one of snow, ice, and granite. Southward the view was limited by the black wall, which, as it trended eastward, merged into granite, and joined the main crest, which forms the eastern and northern boundary of the alpine area, about six miles from where we stood, and some seven or eight miles from Mt. Goddard. This six miles of crest was uplifted as a peaked and pinnacled wall, varying in height from eight to fifteen hundred feet above the cirques that scalloped their bases, and fully twice that height above the general surface of the lake basin into which was collected the drainage of the entire area. Immediately upon our right towered a long, thin ridge of reddish buff granite, fully two miles in length, whose crest rose into several peaks, the whole upper surface of the wall being crowned with fantastically shaped pinnacles. This fine mural mass, which we called Mt. Darwin, is quite precipitous on both sides and both ends, and its pinnacled spine is in places so sharp as to inhibit the climber who might scale its western end from passing forward to the eastern and highest point of the peak. The wall of Mt. Darwin continues in a direction east by southeast as a much lower but even sharper ridge for about three miles. At a distance of two miles it rises perpendicularly five or six hundred feet, forming Mt. Haeckel, and a mile beyond again rises several hundred feet higher, though not quite so sharply, forming the peak called Mt. Wallace. Here the lofty crest, now fairly bristling with minaret-like pinnacles dips, and trends abruptly south for a half mile, where again it turns east by south, zigzagging in that direction, while still flinging aloft its sharp teeth in splendid confusion, to the Palisades, some fifteen miles distant from Mt. Darwin. A mile south of Mt. Wallace, Mt. Fiske (named after the distinguished American historian and writer on the Evolution Philosophy) rears a dark granite pyramid into the clear sky. These peaks and crests are during the summer quite laden with snow and ice, which clings to their sides and bases wherever the acclivity is sufficiently gentle to permit its lodgement. Endowed, in seeming, with the personality with which their whole aspect invests them, it is not difficult for the fancy to see in them a band of gaunt Titans rising from beds of snow and shaking the clinging white from their bare backs and ribs.

From the six-mile stretch of reddish buff crest, several parallel spurs run down to the bosom of the basin. These, singularly enough, are of much purer granite; and two of them, which start respectively from Mt. Haeckel and Mt. Wallace, are rendered conspicuous by the splendid peak which rises from the middle part of each. These are Mt. Spencer and Mt. Huxley, between which there exists a wonderful similarity, not only in the analogy in their positions, but in the peculiar resemblance they bear to each other in size and shape, in the sharpness of their summits, in the snow-gorges that flute their sides, and in the smoothness and purity of the cream-colored granite out of which the peaks are sculptured. Indeed they are beautiful monuments rather than mountain peaks. The gorges between these spurs carry torrents that drain the extensive névé-fields filling all the amphitheatres and glacial basins between the summits of the peaks. At the bases of the spurs these streams empty into a beautiful lake which, though narrow, is fully two miles long, and which curves from the spur of Mt. Huxley northward and westward to the head of the valley of the Middle Fork. This fine sheet of water is thus the reservoir which pours its icy flood over the dam-like wall at the head of the valley forming the ribbon-like cascades which have already been noticed. The altitude of the lake is about 11,000 feet.

By far the largest stream which supplies the lake is one which enters it at the upper end after rather a steep descent over a granite bluff. This stream drains the spacious lake-basin lying at the northern base of the wall previously referred to as bounding the alpine area on the south. The bottom of this basin is one great snow-field, through which crop up bosses of granite, straggling lines of morainal boulders, and heaps of other detritus, — the accumulations of countless ages of erosion. Many large lakes lie in the basin's trough, some few bright with limpid water, others glittering with snow and little icebergs; others still dull with a thick coating of ice that the long siege of the midsummer day's sun is incapable of dissipating.

Such is the birthplace of the San Joaquin; such the origin of that river which turns a hundred mills, irrigates a million acres of grain, fruit, and vine, and which imparts fertility and beauty to the largest and richest of California's valleys. The Sierra crest is nowhere grander, and nowhere more generous is the recompense that awaits the wearied traveller, than here among the sources of the Middle Fork of the San Joaquin.

Sleeping that night at the base of Mt. Huxley, warmed by our fire of gnarled juniper, I dreamed of my task fully done. A well-marked trail led from the distant Yosemite past the long lake, up the snow-basin, and over the divide to the King's River. I hope my dream was prophetic. The way, at all events, is clear. Only the trail waits to be built.

Next morning we climbed Mt. Wallace. Sliding down a long snow-slope to the frozen lake at the bottom of the amphitheatre at the base of the peak, we avoided a bath by the merest luck, and toiled up a rock-filled chute that led to a splintered wall whose highest point was the summit. By nine o'clock I had the camera set up, while Bonner levelled the compass. The aneroid read 13,900 feet. Noon found us back at our camp, eating lunch and photographing Mt. Huxley; and the late afternoon sun flung the shadow of Mt. Spencer over us and over the large frozen lake which is set deep in the granite at the base of the highest crest of Mt. Darwin. But we did not set foot on that crest. The sun had nearly set when after two hours' hard climbing we finally came upon a little platform of rock from which farther ascent is barred to all human beings; and though descent seemed fraught with imminent peril, descend we must and descend we did. Before doing so, however, I took the altitude. The barometer read 13,950 feet, and, as nearly as I could judge, we were between two and three hundred feet of the summit. Reaching the névé just before dark, we slid a full half mile in less than a minute, seized our knapsacks, and after a quarter of an hour's struggling in the darkness, kicked a thicket of tamarack, and camped.

The following day, July 17th, was devoted to photographing and general exploring; and late in the afternoon we returned to the South Fork cañon, where, in a little cavern at the base of a fifteen hundred foot cataract that comes tumbling over the south wall, we had hidden our provisions, safe from molestation by wild beasts. Continuing up the cañon, its slaty structure changed to one of basalt. For a number of miles the descent of the river is much more rapid, and the strong current had ripped out of the basalt a deep channel, the bottom of which was formed of a series of steps, over which the stream poured in a succession of falls. One of these was fully a hundred feet high, and in its descent the water scarcely touched the rock. In this locality the walls of the cañon exhibit a beautiful glacial polish; and the striæ, which also tell of the passage of ancient ice, were visible to a great height.

After having travelled about seven miles from the confluence of the Middle Fork, most unexpectedly we reached the

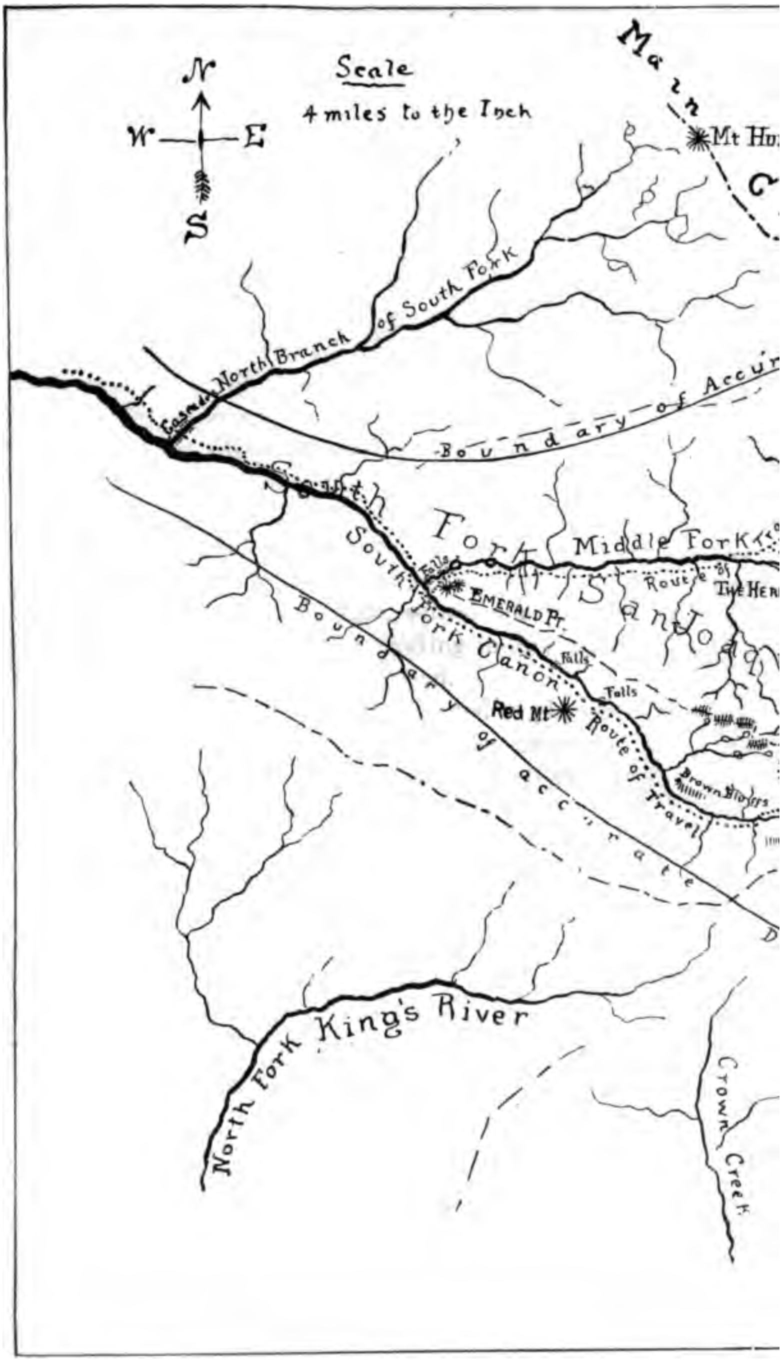

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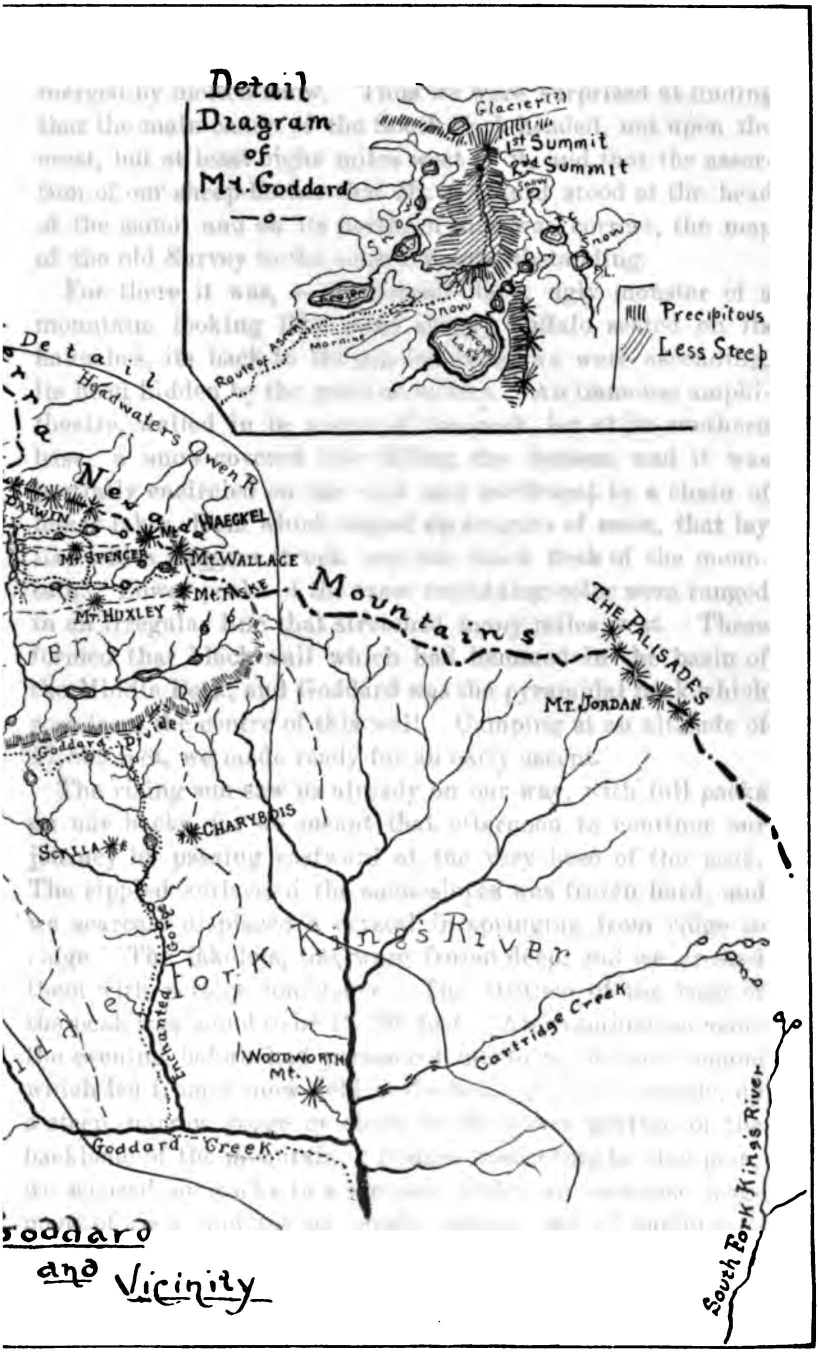
Plate X.


Detail Diagram of Mt. Goddard
Glacier(?)
1st Summit
2nd Summit
Snow
Sn
Snow
Pl.
Frozen Lake
Route of Ascent
Moraine
Precipitous
Less Steep
Detail
Headwaters Owen R.
Nevada
Darwin
Haeckel
Mt. Spencer
Mt. Wallace
Mt. Fiske
Mt. Huxley
Mountains
The Palisades
Mt. Jordan
Goddard Divide
Charybdis
Scylla
Enchanted Gorge
Middle Fork Kings River
Woodworth Mt.
Cartridge Creek
Goddard Creek
South Fork Kings River
Goddard and Vicinity

head of the cañon, at an altitude of 11,700 feet. It opened upon a glacial valley, the bottom of which was fairly submerged by melted snow. Thus we were surprised at finding that the main cañon of the South Fork headed, not upon the crest, but at least eight miles west of it, and that the assertion of our sheep-herder that Mt. Goddard stood at the head of the cañon and on its northern side was correct, the map of the old Survey to the contrary notwithstanding.

For there it was, — a greenish-black, ugly monster of a mountain, looking like some shaggy buffalo seated on its haunches, its back to the glacial valley we were ascending, its head hidden by the great shoulders. An immense amphitheatre, walled in by a spur of the peak, lay at its southern base, a snow-covered lake filling the bottom, and it was partially encircled on the west and northwest by a chain of lesser lakes, from which leaped up tongues of snow, that lay like white daggers struck into the black flesh of the mountain. Lower peaks of the same forbidding color were ranged in an irregular line that stretched many miles west. These formed that black wall which had hemmed in the basin of the Middle Fork, and Goddard was the pyramidal peak which rose from the centre of this wall. Camping at an altitude of 11,800 feet, we made ready for an early ascent.

The rising sun saw us already on our way, with full packs on our backs, for we meant that afternoon to continue our journey by passing eastward at the very base of the peak. The rippled surface of the snow-slopes was frozen hard, and we scarcely displaced a crystal in springing from ridge to ridge. The lakelets, too, were frozen deep, and we crossed them with perfect confidence. The altitude of the base of the peak was found to be 12,200 feet. An examination made the evening before had persuaded me to try a snow-tongue which led from a snow-field at the head of an ice-cascade, up a steep, narrow gorge or chute to the lower portion of the backbone of the mountain. Bonner consenting to this plan, we secured our packs in a crevasse under an immense fragment of rock, and taking lunch, camera, and all our instruments *except the aneroid*, climbed quickly to the top of the ice-cascade. Here the conviction was again forced upon us that the snow-tongue offered the best route of ascent, and up it we toiled. I should judge its angle of acclivity to have been about 45°, its width some thirty feet at the base, and five at the summit, and its length at least a quarter of a mile. When about half-way up, our need of an axe was quite pressing, for the surface was becoming so hard that it took several blows of the toe to pierce the crust and gain a footing. So we took to the cliffs on the left-hand side, and were soon on the backbone, which we found gentle of slope and comparatively easy to walk upon. An hour's walk, now over flinty blocks and fragments of all sizes, now over rock in place, brought us to the first summit, on which we built a monument and proceeded to take our observations.

When I discovered the absence of the barometer, I believe I was at that moment the most disgusted person in the State of California. Bonner refused me the consolation of a good kicking on the ground that his footing was too precarious, and during the four hours we remained on the peak I utterly refused to be comforted, even by the view, which was in many respects the finest I had ever beheld. Thanks to my stupidity, the exact altitude is still to be determined. The old survey roughly estimated it at 14,000 feet, but as, levelling across to Mt. Darwin, our peak was found to be the higher, I feel confident that the mountain will ultimately be determined to be considerably over 14,000 feet high.[1]

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[1] Before leaving the subject of the altitude of Mt. Goddard it may be interesting to note the uncertainty that may still be said to exist with regard to the dominance of Mt. Whitney over all the other high mountains in the United States. The latest surveys have reduced the height of the peak to 14,470 feet, which practically dethrones it from its lofty position as the summit of the United States, to use the phrase of Mr. Clarence King. But is it the summit of California? Without more than noticing the fact that the present estimates place its height as only twenty-six feet greater than Mt. Shasta, let us see whether it is surely the loftiest peak of the Southern Sierra. The geologists of the old California Survey climbed no peaks on the main crest between the Kearsarge Pass, about fifteen miles north of Whitney, and the pass at the head of Mono Creek, fully sixty miles north of the Kearsarge Pass; and no subsequent survey has entered the region. The conclusion that the peaks in the vicinity of Mt. Whitney were the highest in the range, was obviously assumed from the general decline of the crest north and south of that locality; but that this declination is only a general and not a uniform one, there is ample reason to believe. North of the Kearsarge Pass, the crest is admittedly nearly as lofty as

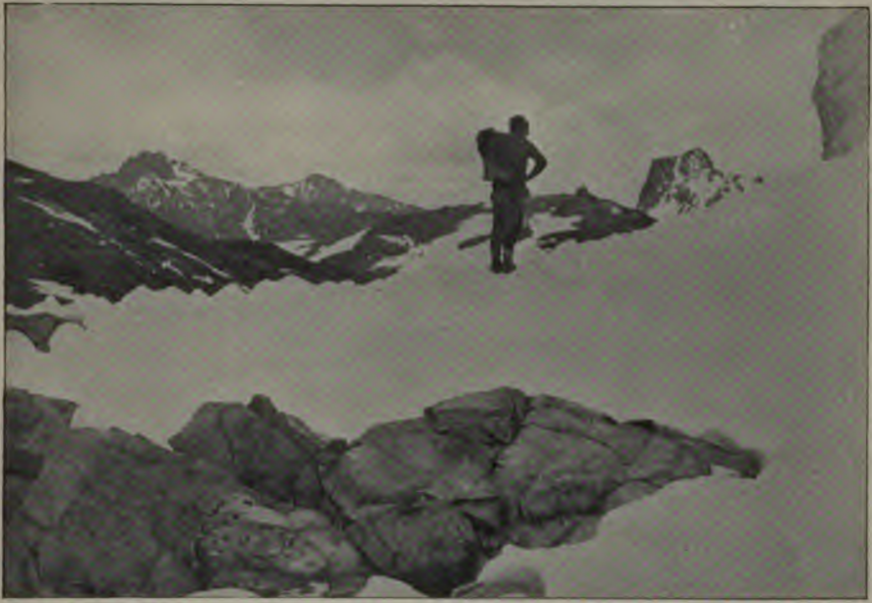
From Mt. Goddard to the main crest at the Palisades the distance was from fifteen to twenty miles, and the intervening district was occupied by peaks, walls, and alpine gorges of great depth. Many of the peaks were but little lower than Mt. Goddard itself; and, on the whole, the width of the zone of crest is considerably greater here than anywhere else in the Sierra. The singular extension eastward of the axis of the range from Mt. Darwin is sufficient to account for this fact.

To the geologist, Mt. Goddard and its vicinity offers a most interesting and important field for study and speculation. As is true throughout all but the northern portion of the range, the igneous rocks — the lavas, basalts, and other volcanic materials — cannot be referred to volcanoes or visible vents in the vicinity of their occurrence, for there are none. They have doubtless been erupted through fissures in the granite and aqueous formations; but their position and relation to those rocks and to the metamorphic slates and metamorphosed sedimentary rocks generally present many

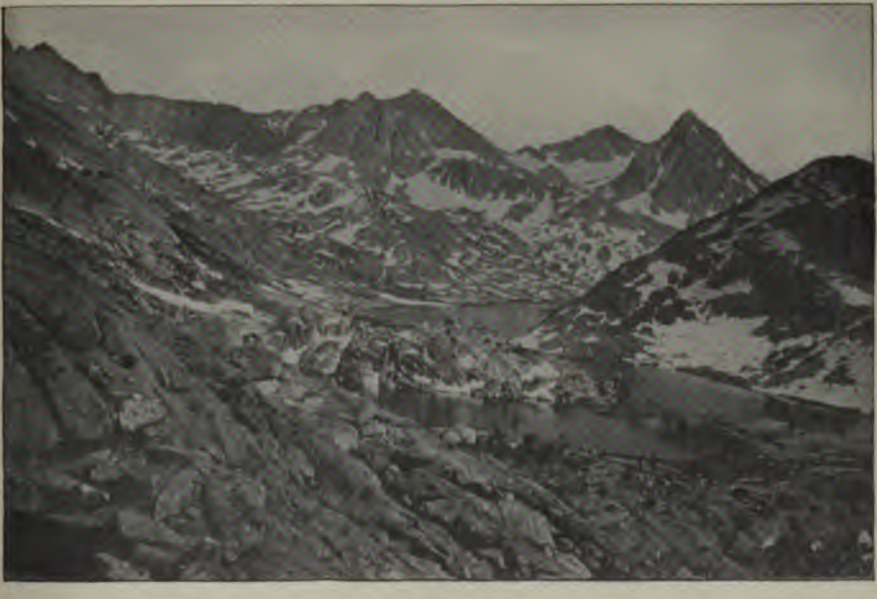
south of it, yet at a distance of about twenty-five miles, the group called the Palisades tower high above the adjacent portions of the crest, and from all sides are exceedingly conspicuous. This group is too far distant from the peaks climbed by the old surveying party to have enabled them to determine even their approximate height by levelling, and no figures with regard to the altitude of the Palisades are stated in their report. Another circumstance tending to show that the Palisades are loftier than has been supposed, is the fact of their great distance — fully fifteen miles — from Mt. Goddard, itself some 14,000 feet in elevation. Though it is not unusual elsewhere in the Sierra to find the main crest less lofty than some of its western spurs, I do not know of any locality in which so great a distance separates a peak as high or higher than those of the adjacent portion of the axis of the range. The inference, therefore, from the great distance of Mt. Goddard from the crest, is that the latter is higher, and that the Palisades which dominate that crest by something like five hundred feet are correspondingly higher still. If the crest were of softer rock than Mt. Goddard, this inference would not hold good; but such is not the fact, — the Palisades appearing to consist of the same material and to be of contemporaneous formation with Mt. Goddard. If, therefore, Mt. Goddard is 14,000 feet, the general crest to the east only as high, and the Palisades five hundred feet higher than that crest, the latter would be higher than Mt. Whitney. And this, moreover, would appear to be a minimum calculation, for Mt. Goddard is probably higher than 14,000 feet, the main crest ought to be higher than Mt. Goddard, and the highest of the Palisades may dominate the adjacent crest by more than five hundred feet. On the whole, it is by no means impossible that the Palisades may be found to be higher than Mt. Whitney.

problems which trained minds will eventually concern themselves in solving. Mt. Goddard and the lower peaks which form an irregular wall westward are of slate, which, though really of many kinds and of many different colors, is of a greenish-black when seen in the mass. Silver, both in the free state and in combination, and a number of other metals and minerals are found in these slates. North of Mt. Goddard and these western peaks the granite appears, and to quite as great a height as the latter. To the south in the cañon, I noticed basaltic terraces sitting upon the reddish and altogether different kind of slate out of which the cañon has been eroded. South of the cañon the rock is granitic again. South of Goddard itself the wall of the amphitheatre, which is a spur of the mountain, changes insensibly from blackish slate to the purest gray granite. East of the peak, the divide between the King's and San Joaquin rivers similarly graduates into a material which, though showing in places the effects of great heat, is crystalline and indubitably granite. The crest to which the divide is joined is also granite, reddened, I think, by iron; and south of the divide from Goddard quite over to the Palisades lie a series of parallel gorges, separated by crested divides, the whole black as night, and, if a hasty examination did not deceive, formed of slate through which run dikes of a very old lava. The Palisades themselves are either of igneous material or of metamorphic slate. Thus we have granites, lavas, basalts, and slates overlying, underlying, and horizontally contiguous with one another, in quite obvious nonconformity with theory and precedent. That the granites in this region date back to the Jurassic period, and that the eruptions of the lavas are to be referred in every instance to the late Tertiary, is, I think, highly questionable.

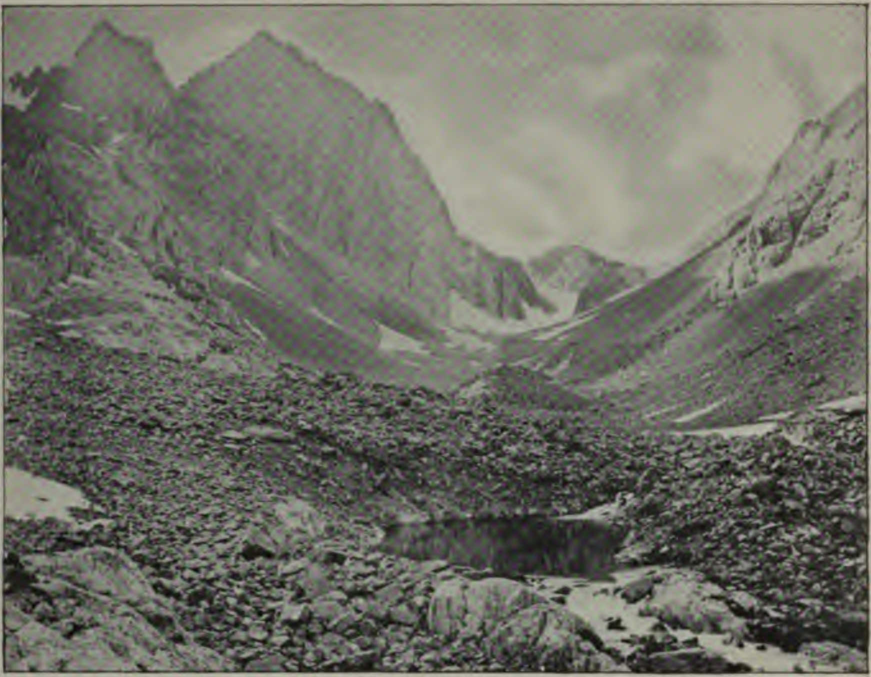
But whatever the story they tell to the geologist, these diversities of formation, adding as they do an element of contrast and variety, contribute not a little to the effectiveness of the picture, and invest the landscape with a heightened sublimity. One of these gorges to which I have alluded as leading on the southern side of the divide between the two rivers, is entitled to more than passing notice. Indeed,



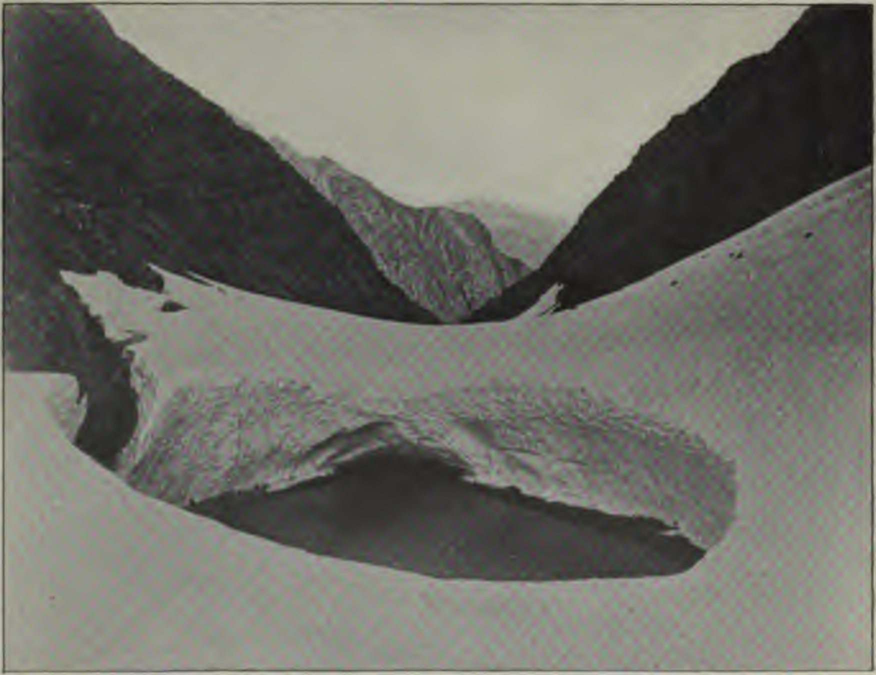
VIEW SOUTH FROM MOUNT WALLACE.



HEAD OF THE MIDDLE FORK OF SAN JOAQUIN RIVER.
From photographs by Theodore S. Solomons.



ROTUNDA IN THE ENCHANTED GORGE.



SNOW TUNNEL IN THE ENCHANTED GORGE.
From photographs by Theodore S. Solomons.

I do not know how more fittingly to conclude this brief description of the locality of Mt. Goddard than to give some account of the Enchanted Gorge.

We were caught in a storm while on Mt. Goddard, and were glad to camp at the highest clump of tamarack shrubbery we could find. This happened to be considerably above the big frozen lake, and ice and snow lay all about us. I have never passed a night in a higher altitude than this, nor do I care to, for we must have been nearly 13,500 feet high. We had no sooner built a fire than the snow began to fall, and though for a time it was nip and tuck between the two elements, our pitch-saturated logs conquered at last. In the morning we climbed round the southern base of the mountain, and made our way along the divide in a blinding storm, which becoming monotonous after six or eight hours, we determined to descend a deep gorge that had captured our admiration and aroused our curiosity when on the summit of Goddard. At half-past one this gorge lay directly south of us, and in an hour we had descended to its head, which we found was guarded by a nearly frozen lake, whose sheer, ice-smoothed walls arose on either side, up and up, seemingly into the very sky, their crowns two sharp black peaks of most majestic form. A Scylla and a Charybdis they seemed to us, as we stood at the margin of the lake and wondered how we might pass the dangerous portal. By a little careful climbing we got around the lake, and stood at the head of the gorge. Instead of the precipice we had feared to find, the narrow bottom was filled with snow, furnishing us a kind of turnpike, down which we fairly flew. Down, down, by sinuous curves, our road conducted us, as though into the bowels of the earth; for the walls, black, glinting, weird, rose a thousand and two thousand feet almost perpendicularly over our heads, and were lost in the storm-clouds that were discharging upon us a copious rain. For at least three miles we sped over the snow, when of a sudden the gorge widened into a kind of rotunda, the snow disappeared, and the stream which I expected to emerge from under it was conspicuous by its absence, nor could the roar of its subterranean flow be even faintly heard. Imagine a well a thousand feet wide and nearly twice as deep, its somewhat narrow bottom piled with fragments of rock, from the size of pebbles to that of buildings, the walls and floor of every hue that lends itself readily to a general effect of blackness, and the rotunda is pictured. Several torrents fell over the perpendicular western wall into a lake that had no visible outlet.

After an hour's struggle over the gorge floor, the roughness of which defies description, we reached the lower end of the rotunda and the beginning of another shorter stretch of snow. The walls had now taken on the metallic lustre of many shades of bronze, the brilliancy of which was heightened by the polish imparted by the glacier which had formerly filled this deep gorge. The snow floor again giving place to monster rock fragments, again we struggled over the uneven surface; when, without warning, below a little moraine-like embankment, out gushed a great torrent of water, which, on reaching a part of the gorge so narrow that the snow yet filled it, burrowed underneath, darted out a hundred yards beyond, soon met another drift of snow under which it burrowed, as before, and in the middle of which it formed a lake with perpendicular banks of snow fully thirty feet in height, only to plunge again under the snow, this time leaving a roof so thin that my companion's feet pierced the crust, and he fell in up to his waist. With great coolness and dexterity, however, he extricated himself before I had more than grasped the situation. And so, till the fast-gathering gloom warned us to seek a camping-spot, we worked our way among the manifold wonders of that marvellous gorge. When finally we found trees on a kind of shelf, high above the stream, and, wearied with our day's toil, prepared to camp, the barometer registered a drop of nearly six thousand feet from the Goddard divide.

Next day we continued the descent of the gorge to its confluence with Goddard Creek, which from Mt. Goddard we had identified as heading in a number of lakes on the southeastern base of the mountain. Five miles below the confluence of the stream draining the Enchanted Gorge, Goddard Creek empties into the main Middle Fork of the King's River, twenty miles above Tehipitee Valley, the deepest

"Yosemite" in the range. We explored and photographed this Middle Fork country and the Tehipitee, securing a number of excellent negatives, and then took the Granite Basin trail to our destination, the King's River Cañon, which we reached on July 28th, hungry and tattered, but in superb physical condition.

So accustomed had we become to our packs during the latter week of our trip, that it is no exaggeration to say that we had not felt the weight of the knapsacks, though when we reached our journey's end they weighed not less than twenty pounds apiece. The little expedition had been an entire success. In sixteen days we had covered fully three times as much territory as we could have hoped to explore had we travelled with a mule or burro. Yet my eyes had constantly been on the alert for passages practicable for animals; and to such good purpose had the quest been pursued that the Sierra Club will shortly place on file in its Club Rooms maps and descriptions which will enable the enterprising mountaineer to leave the Yosemite Valley with loaded animals, and to thread his way to the King's River Cañon through the very heart of the High Sierra.

Avalanche Basin, Montana Rockies.

By Lyman B. Sperry.

Read January 8, 1896.

Each transcontinental line of railway, as it pushes its track from the Mississippi Valley to the Pacific Ocean, opens up to the tourist, the scientist, and the lover of nature many regions of varied and peculiar interest. The more northerly lines, particularly in crossing the Rockies and Cascades, pass directly through several truly wonderful localities; and they also reach the threshold of scenes more remarkable than those which are visible from the train. The Great Northern Railway — youngest of all the transcontinental lines — passes through regions of unusual attractiveness, but the traveller might easily remain in ignorance of the fact that close to several stations on this route, both in the Rockies and in the Cascades, there are scenic regions unsurpassed on our continent.

It is my desire in this article to call attention to such a region, — that embracing Lake McDonald in the Rockies of Northwestern Montana, and extending thence northward to British America, and in particular to Avalanche Basin, a precipitous mountain pocket or valley, rivalling in striking features and general impressiveness the far-famed Yosemite.

This remarkable U-shaped valley or basin, which the Creator kept hid away so long in this wild retreat, remained practically undiscovered until August, 1894, when Charles Howe, the first settler on the shores of Lake McDonald, saw it from near the summit of Brown's Peak. A few days later he reached the basin by going around the western and northern slopes of that mountain. He was at the time hunting for a glacier that rumor had located in that vicinity, and, seeing snow-fields that he believed to be glacial just above and beyond the basin, he at once reported to me not only the finding of "a large glacier," but also "a beautiful little lake in the valley below the glacier."

During the last week in May, 1895, accompanied by J. W. Falls, of Kalispell, Mr. Howe again visited the basin, and camped over night at the foot of the lake. On the third of June a party consisting of Professor J. Paul Goode, Messrs. E. R. Shepard (photographer), W. O. Jones and W. A. Wittick, of Minnesota, and the writer, — all under the guidance of Frank Geduhn, one of the early settlers at Lake McDonald, — penetrated the thick and tangled forests between Brown's Peak and Goat Mountain, entered the deep valley, and camped on the lake shore. Our party carefully noted the most striking features of the locality, photographed its more conspicuous points, and, because of the number of avalanches seen and heard during our stay, agreed that Avalanche Basin would be a most appropriate name for the place, — a name which Mr. Howe and Mr. Falls have since heartily approved.

Finding that a single day in this remarkable place could give but a taste of its delights, some of our party determined to visit it again as soon as practicable. During the latter part of July a passable saddle and pack trail was cut from the head of Lake McDonald to the foot of Avalanche Lake, and on the first day of August, accompanied by Professor L. W. Chaney, of Carleton College, and Mr. A. L. Sperry, of Owatonna, Minnesota, I made a second visit to the region. On this trip we took the necessary instruments for determining temperature, altitudes, distances, etc.; and during our stay of ten days in the basin, Messrs. Chaney and Sperry secured the desired information. Estimates thus gave place to scientific measurements.

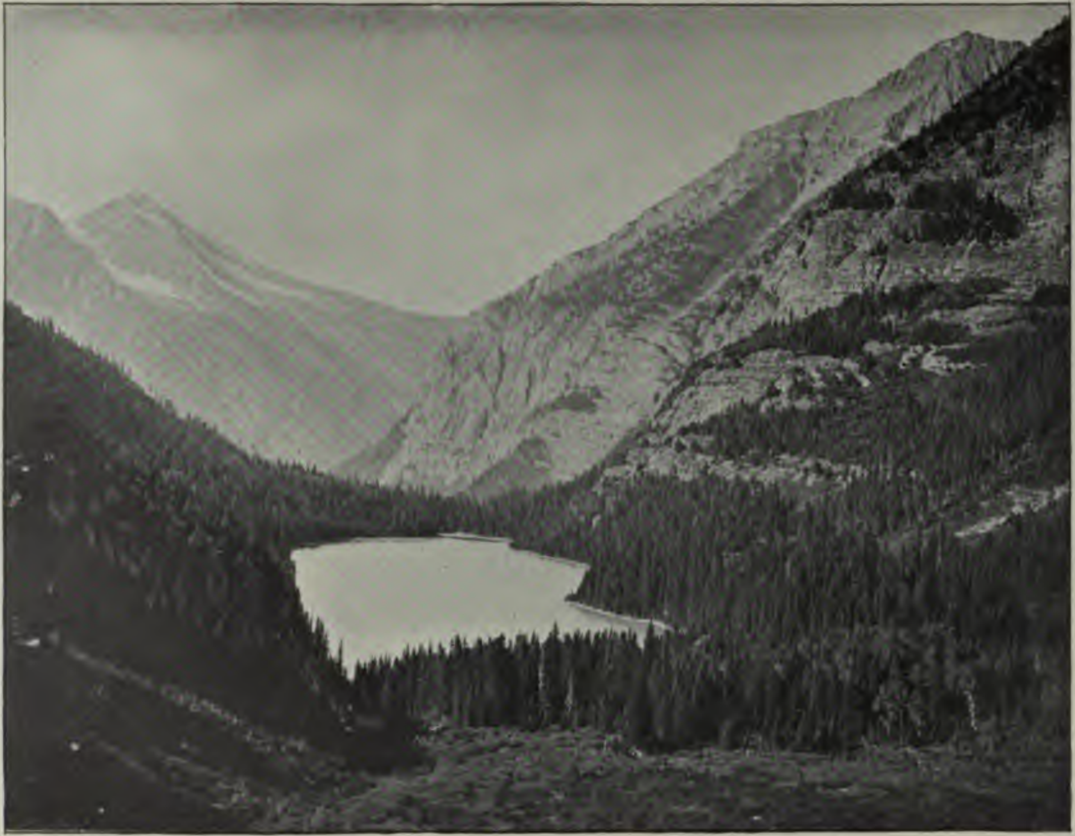
We had expected to be the first to pass over the trail on horseback into this wild retreat; but Mr. J. H. Edwards, of Kalispell, with his wife and a brother, reached the lake a few hours ahead of us, having followed immediately upon the heels of the trail-makers. Mrs. Edwards, therefore, enjoys the distinction of being the first woman to visit Avalanche Basin. It was a difficult and dangerous journey for a woman to make at that time; but since then the trail has been so improved that the trip from Lake McDonald to the Basin may now be made in a few hours, and without unusual danger or great fatigue.

Like many other things in nature, Avalanche Basin "must be seen to be appreciated." It defies satisfactory description, and demands personal visitation and inspection from all who would have a correct conception of its grand proportions, its impressive features and rare beauties. It constantly reminds one of the Yosemite; and yet it is as unlike that famous valley as a bewitching waltz is unlike an inspiring march, as different as a poem and an oration. Unfortunately it is impossible to get photographic views which will give an adequate impression of its size and shape, or of the heights of the enclosing walls. I know of no other place where the camera appears so impotent. Only the human eye, serving an appreciative mind, can take in the fine details of rock structure, the infinite skill of erosive agents, and the delicate coloring of sky, forests, lake, and rocks on exhibition here; but the accompanying plates may help to supplement inadequate verbal descriptions.

But a more extended description is perhaps necessary to tell how this new wonderland is reached, and something more of the beauty and grandeur of the scenes through which one passes to reach it, and which lie yet farther beyond.

Let the reader then imagine himself westward bound on a transcontinental train of the Great Northern Railway. About nine o'clock on the morning of the second day from St. Paul he reaches the Rocky Mountains, and with majestic heights on either side glides into the Marias Pass, and winds along the banks of mountain streams till noon, when the train is left at Belton Station, a pleasant spot 1,198 miles west of St. Paul, and thirty miles east of Kalispell, the commercial centre of the famous Flathead Valley. From this station we take an easy conveyance, and, crossing a substantial bridge over the rushing waters of the middle fork of the Flathead River, strike at once into a dense forest of fir and cedar. Three short miles bring us to the shores of Lake McDonald. As we emerge from the forests and look northward across the sixteen miles which measure the length of this bewitching mountain mirror, our delight becomes intense. We are over three thousand feet above the level of the sea, breathing the most invigorating mountain air, and looking upon a body of water as clear as crystal and as pure as the Creator's chemistry can make it. The average width of the lake is between four and five miles, and its outline is quite regular for a mountain lake. It has neither deep indentations nor long projecting arms, yet the western shore is sufficiently sinuous to form a number of gracefully rounded points, each of which is a most inviting spot for summer cottages and camps. The exact depth of the lake is unknown, as soundings have not yet been made; but evidently it is very deep. This charming body of water is completely girt by low mountains which, both on the east and on the west, rise gradually to heights of two thousand feet or more above the surface, and are forest-clad to their summits. At the north end of the lake the mountains spring more abruptly from the general level, and attain a much greater altitude, their rocky, snow-dotted heights stretching well above timber line. Between and beyond the peaks which rise so sharply near the head of the

LAKE MACDONALD, MONTANA ROCKIES.
From a photograph by E. R. Shepard, Minneapolis.



AVALANCHE LAKE AND BASIN FROM BELOW THE HEAD WALL.

From a photograph by E. R. Shepard, Minneapolis.

lake, we see other peaks, domes, walls, and ranges which an experienced mountaineer at once recognizes as much higher and more rugged than those nearer by. "Ah!" you exclaim, "there is real grandeur yonder."

For the present, however, let us withdraw our gaze from the distant peaks, and turn our eyes to the outlet of the lake at a point near where our carriage road ends. We see here a rushing stream of clear, cold water, deep enough to be navigated by small steamers of sufficient power to stem the current. Its volume and velocity, together with the appearance of its banks and bottom, indicate that heavy rains or snows are habitual in the mountains northward. It is, indeed, a beautiful stream, and the fishing is good. The nearer and the more distant views from this end of the lake are delightful. It is consequently a good place to stop for a few days, and satisfactory accommodations at fair prices may be had here; but if one prefers, he may at once take the trim little steam launch, "F. I. Whitney," and go to the head of the lake, where good accommodations may also be had at reasonable rates.

The views from the steamer as we speed northward are more than satisfactory, — they are truly delightful. To speak of them as "grand" does not best describe the impression, for the surrounding mountains are not sufficiently high and rugged to justify the term. "Glorious" will better express it, especially when clouds and sun — or moon — conspire to make up the effect. We are floating over a dark blue mirror, set in the floor of a mountain valley, whose gracefully rising slopes of dark green conifers, flecked here and there by the lighter green of a few deciduous trees, are reflected with a delicacy of color and sharpness of detail almost as perfect as that which characterizes the real mountain sides. Few bodies of water give such clear and charming reflections as are seen in Lake McDonald. Its surface is entirely destitute of islands, projecting rocks, sand-bars, or shallows, and equally destitute of rushes or other vegetation. The beach of clean, polished gravel is so narrow and so sharply defined as to appear like a delicate ribbon drawn to indicate where the real forests end and the reflections begin. Among the reservoirs of the Rockies, Lake McDonald is clearly the queen.

After a day or two of fine fishing with the incidental invigoration resulting from drinking the pure water, breathing the pure air, and gazing upon the delightful scenes about the head of Lake McDonald, we proceed northward about fifteen miles into the very heart of the Rockies, to visit Avalanche Basin. We mount the horses assigned us, and after fording McDonald Creek turn directly northward and follow up its valley for about eight miles. Then turning eastward we ascend the south bank of Avalanche Creek about five miles to its source, the western extremity of Avalanche Lake. On the way we pass along the rocky brink of a fine gorge which the waters have cut through a ledge of hard, crimson, jasper quartzite. In this gorge are several beautiful cascades and cataracts, which we halt to study somewhat carefully. Farther on, after a little industrious climbing into an open space under the shade of majestic hemlocks, we reach Moss-Rock Springs, where a goodly volume of icy-cold water gushes from underneath a confused jumble of quartzite boulders. The stream seems to pause a second to look at us, and then, gliding briskly away among the moss-covered rocks, quickly dashes over the cliffs and plunges into Avalanche Creek.

Both horses and riders are glad to stop and refresh themselves at these springs. But we are anxious to reach our camping-place and dinner. So after a few moments' rest, accompanied by solid enjoyment of the peaceful forest scene, we start onward. In about half an hour we suddenly emerge from the dense growth of balsam firs, and stand on the shores of Avalanche Lake. Almost unconsciously and instinctively we lift our hats. Eastward, and about two miles away, is the head of the basin. Down its lofty, precipitous face numerous cascades and cataracts are leaping, gliding, dancing, plunging, each stream appearing in hurried strife to reach the lake first of all.

We judge from our experiences in clambering up several steep places along the trail, that we have gained considerable in altitude; and our barometer assures us that we have risen over eight hundred feet since leaving Lake McDonald, and that we are now very nearly four thousand feet above the sea.

The view is surprising and bewildering, the more so through contrast. For several hours we have been traversing a valley from which the mountains on either hand stretch gradually and gracefully upward to the limit of vegetation; but here the encircling mountain walls, instead of sloping gently upward, rise sharply and defiantly about us, soon leave all vegetation behind them, and, pushing ever upward, seem to pierce the very skies. Less than two miles ahead of us the valley abruptly terminates against walls which rise almost perpendicularly to altitudes averaging more than three thousand feet above the lake which nestles at their base. In all directions the walls seem to unite in saying, "Thus far, but no farther." Apparently the only way to get out of this great enclosure is to retreat by the trail over which we came.

But we feel no desire to return at once; there is too much about us that excites our keenest interest. We gaze out over, and then down into, the little gem of a lake at our feet, three-fourths of a mile long and half a mile wide. Its waters are of a delicate turquoise blue as we look across their surface, but clear as air whenever we look directly down into them. Numerous sportive trout are scudding here and there, as if carrying to their neighbors the startling news of the sudden appearance of strange bipeds and quadrupeds upon their shores, while farther out in the lake large numbers of its finny inhabitants are excitedly jumping out of the water, as if to catch a glimpse of the strange creatures of whose advent they have just heard. The Nimrods of our party fairly dance with delight at the sight of so many "speckled beauties," and are soon enticing the inexperienced and unsuspecting creatures away from their homes and friends.

But while the fishers have been busy taking in the "brain food" which is to become our dinner a little later on, the other members of our party have been busy taking in the surprising scenes. We have been looking up to rocky heights, some of which toy with the clouds nine or ten thousand feet above the sea. We have been watching the sparkling waters which the sportive clouds have contributed, pouring with peals of laughter and sounds of merriment down the quartzite cliffs. We count at least ten streams that are thus coursing down the slopes and hurrying into the lake. Rising from the general level of the high walls which enclose the basin, we observe a number of peaks, ridges, and domes, which, because of resemblances more or less complete, our June party ventured to name, respectively, Cathedral Dome and Spires, the Sphinx, Sentinel Peak, the Castle, and the Matterhorn.[1] The latter is a striking duplicate, on a smaller scale, of the celebrated Alpine peak by that name.

We found that the numerous streams which flow down the walls into the lake vary surprisingly in size and appearance according to the time of the day, season of the year, and character of the weather. In the evening after an unusually warm day on the mountain tops, each stream becomes a maddened torrent that, in its wild plunging, clears many of the jutting shelves of rock upon which, when a smaller stream, it feebly falls and is dashed into spray. In the morning, especially if the night has been pretty cold, the stream may not be more than one-tenth the volume of the preceding night. For the same reason, immediately after a cold storm — which is rain in the valley and snow on the heights — the volume of water flowing into the lake is comparatively small. At first we could hardly believe the testimony of our eyes, that the streams fall rapidly during and after a rain, and rise steadily during dry, warm weather. In order to experience the remarkable changes in Nature's conditions and activities here, one may have to remain several days. Unfortunately, the photographer arrived during a cold spell, and the views he was enabled to take show comparatively few streams, and those few are at their lowest

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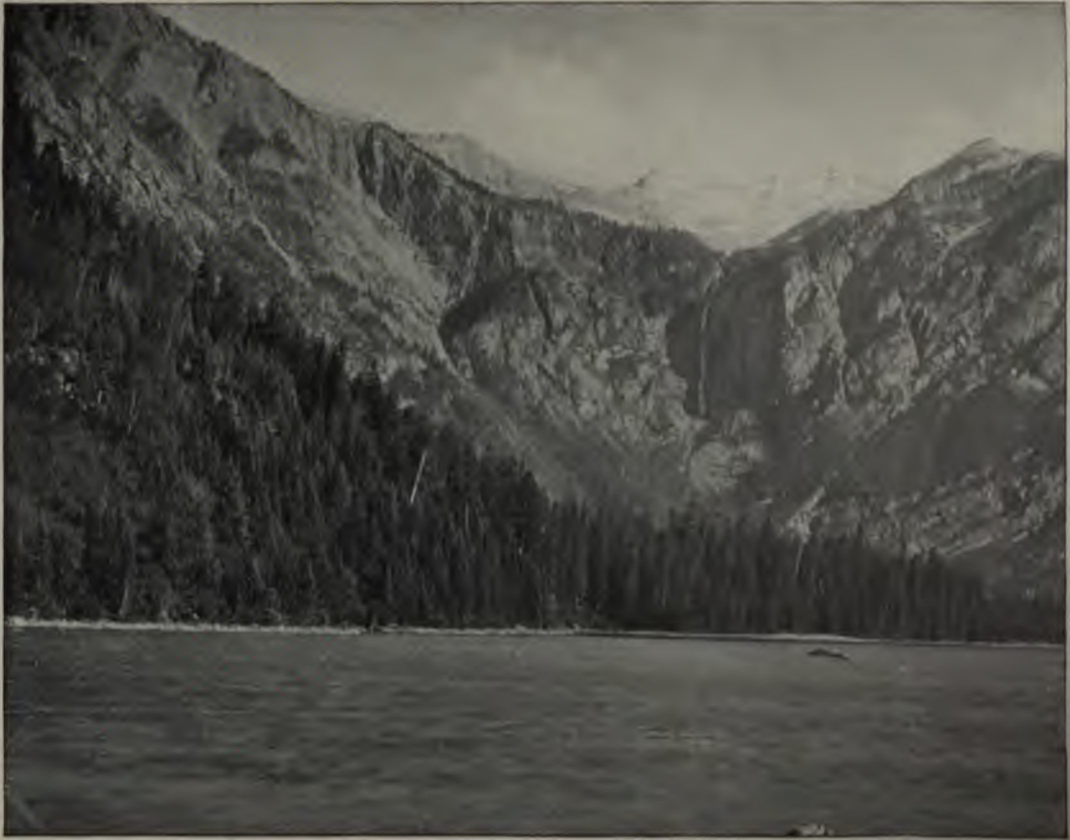
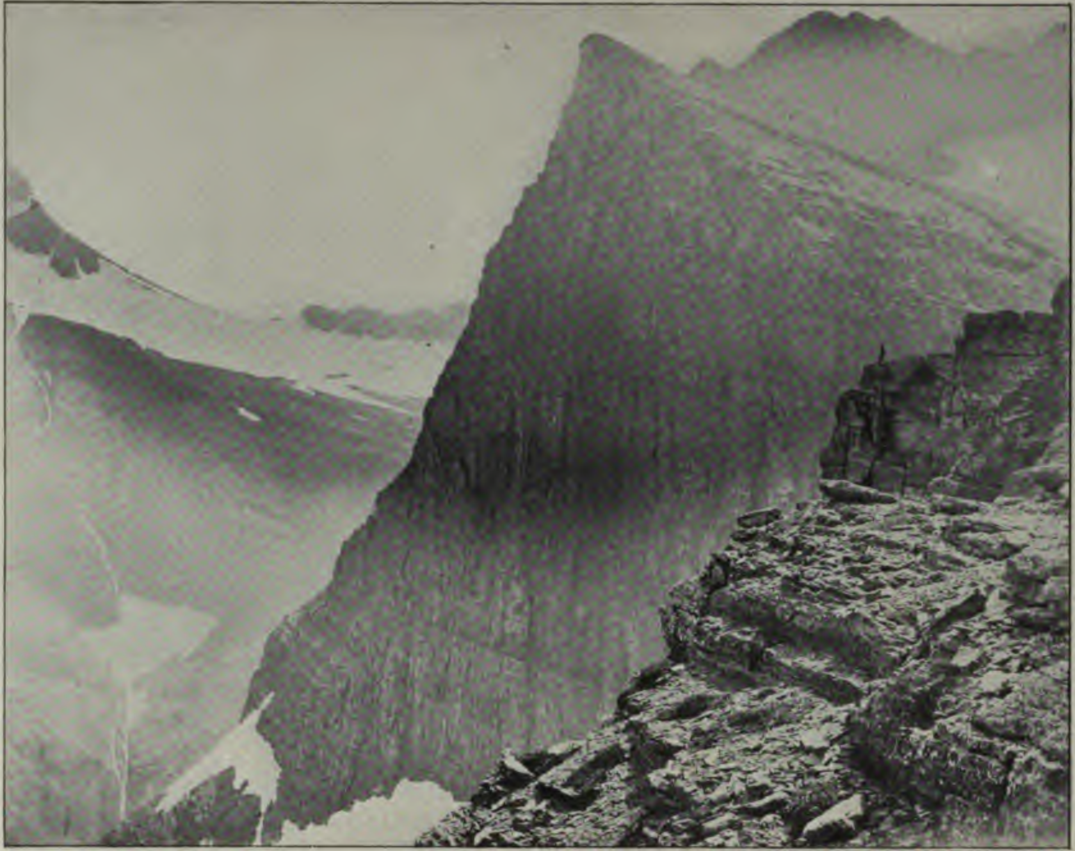
[1] Professor Chaney and Mr. A. L. Sperry, by careful measurements, found that the top of Sentinel Peak is 2,680 feet above the level of the lake; the Matterhorn a little over 4,000 feet; and Cathedral Dome about 4,500 feet. The lowest notch through which a cascade breaks over the cliffs is nearly 2,400 feet above the lake.



HEAD WALL OF AVALANCHE BASIN.
LOWEST POINT AT CASCADE 2,370 FEET ABOVE THE WATER.
From a photograph by E. R. Shepard, Minneapolis.



GLACIER PEAK, IN THE MONTANA ROCKIES.

A PERPENDICULAR WALL OF 3,600 FEET.

From a photograph by E. R. Shepard, Minneapolis.

stage. Our experience of nearly two weeks in the basin illustrated the general truth that places of real scenic merit grow upon one with acquaintance.

Across the foot of the lake, wedged into its outlet, is a large, compact raft of old logs or decaying trunks of trees, the tell-tale remains of an immense avalanche which many years ago cut a swath about a mile in length and twenty rods in width down the southern slope, sweeping the forests into the lake, and producing a bar of rocky debris which extends out some distance from the shore line. The bark and tops of the trees then uprooted have disappeared, and the diminished trunks, huddled together at the outlet of the lake, are solemn witnesses of the terrible avalanche which thundered down those steeps perhaps a century ago. The southeastern part of the basin is kept almost entirely destitute of vegetation by the frequent and destructive avalanches which sweep that region. Two exhibitions of their power were given us during our June visit. Fortunately there is an abundance of good camping-ground entirely out of reach of landslips; and besides, during the season when tourists are most likely to visit the basin (July and August), large avalanches are impossible. The high snow masses, like the mountain goats, have then disappeared for the season, not to return again till fall.

Crowning the head of the lake is a fine large grove (perhaps two hundred acres in area) of medium-sized balsam firs, under which, instead of brush and fallen timber, there is a delightful carpet of moss, interspersed with little clumps of ferns, delicate trailing vines, and flowers. This mossy and flower-decked carpet helps to make an ideal spot for camping. The subdued roar of the distant cataracts, and the rippling laughter of the more quiet streams near by, mingled with the soothing murmur of the tree-tops and the gentle caress of the cool breezes, — ever ladened with the healing perfume of the sheltering balsams, — make sleep in Avalanche Basin at this season of the year as easy and refreshing as that of a healthy child. The noise and bustle and cares of the busy world have never intruded here. It is an ideal spot for one who wishes to withdraw from the haunts of men for the quiet and recuperation which so many Americans so sadly need.

From a camp anywhere on the shores of the lake in the basin numerous excursions may be made. They may be either short or long, easy or difficult, according to one's tastes and abilities. As yet only one route has been found by which the top of the enclosing walls may be reached. Fortunately this route leads directly to the base of the Matterhorn, which is on the southern crest. The point reached by this climb furnished a grand view in nearly all directions. Southward, and below our point of outlook, lies another amphitheatre or basin, dotted with many beautiful little groves of fir, tiny meadows, and sparkling pools. It looks like a veritable paradise for game and for camping parties. The little notch in the wall from which we get this view is evidently much used by mountain goats in going from the high pasture shelves of one basin to those of the other. Their trails and sleeping-places are often seen as we climb about near the crest. The animals themselves frequently appear on distant ledges grazing, climbing, and skipping about upon the dizzy heights. Looking southward across the beautiful basin at our feet, we see nearly the entire surface of Lake McDonald smiling in the sunlight. Its nearest shore is not less than ten miles away, but the clear atmosphere of this altitude makes the lake seem but a short five miles distant. Apparently, it would be as easy to reach our point of outlook from this southern basin as from the side we came up. If an exploration shall prove it to be so, one of the delightful mountain tramps of the future will be to leave the head of Lake McDonald in the morning, and going by the way of this (as yet unnamed) basin, and through the pass at the foot of the Matterhorn, reach the head of Avalanche Lake in the afternoon. A good climber, by taking an early start, might make the trip in time for a noonday dinner in Avalanche Basin; or the trip could be reversed.

On the southern side of Avalanche Basin about half-way between its floor and the base of the Matterhorn, and about two thousand feet above the lake, lies a beautiful spot called Terrace Park. The stratification and tilting of the formation are such as to give rise to a series of little meadows, studded with tiny groves of evergreens and set with a series of pools, each on a different level. The steepness of the general dip at this point is so great that though they are separated from each other by but a few rods, it is impossible to get a photograph that will show distinctly even two consecutive pools. This locality is sure to become very popular with frequenters of Avalanche Basin. The trip from Avalanche Lake up to the Pools and return may easily be made in a day, even by those who are not accustomed to mountain climbing in thin air, providing an early start is made and the climbing is taken leisurely. The extended views northward from the vicinity of Terrace Park are quite as satisfactory as the beauties of the park itself.

There are several other short and comparatively easy trips that may be taken from our camp by the lake; but the amount of space allotted for this article forbids even an attempt to name and locate them.

Avalanche Basin abounds in rare attractions and opportunities for the ambitious and hardy mountaineer, as well as for the comparatively timid and feeble. All around it are peaks and snow-fields that invite the lover of alpine hardships. At the eastern extremity of the basin is a narrow, tortuous belt of timber stretching almost continuously from the base to the summit. It looks from the valley as if the ascent of the wall might be made by following this winding stretch of timber, and I believe it can be accomplished; but an attempt made by two of our guides, both of whom are experienced mountaineers, proved unsuccessful. They found hidden in the timber perpendicular cliffs which they could not scale. This fall another attempt will be made near the same point, and it is to be hoped that the men will find or make a way to the crest. This is very desirable; for just above and beyond the crest are lofty peaks and ridges, large perpetual snow-fields (probably some of them dying glaciers), beautiful lakes, many interesting geological studies, and views so extensive as to be unspeakably grand and inspiring.

The mountain peaks and valleys all about Avalanche Basin seem to bristle with taunts of defiance and bantering invitations. As one climbs about the inner slopes of the basin, at altitudes ranging from four thousand to eight thousand feet above the sea, and peers above and beyond the frowning walls, he cannot help wondering what marvellous scenes and interesting conditions may be nestling "just up behind that ridge," or "over in that valley," or "on the other side of that majestic dome." One is constantly impressed by the fact that those unexplored regions offer rich rewards to all who are fond of adventure and discovery. A letter recently received from a party who was trapping and hunting in the vicinity reports the finding of sulphur springs about ten miles east of Lake McDonald, and also the discovery of other lakes which, though smaller in size, rival McDonald in beauty and interest. The waters of the springs so far discovered are cold; but it is probable that hot springs will be found in that region. Game is abundant for the sportsman; glaciers are there for the edification of the scientist; adventure for the ambitious and hardy, and glorious scenery for the delight of all who have the "seeing eye."

The scenery between Avalanche Basin and the British lines increases in ruggedness and grandeur as we go northward. The mountain peaks are not only higher, more rugged, and more defiant, but more interesting in geological structure, and more striking in form and color. About thirty miles from Lake McDonald our party came upon an interesting glacier occupying a circular amphitheatre about four miles in diameter. The movement of the glacier is eastward into the valley of the Belly River, — a tumultuous stream, which, curving northward before crossing the international boundary, flows into the Saskatchewan. This glacier was named in honor of the geologist of our party, Professor L. W. Chaney, of Carleton College, who spent two days in the study of its more interesting features, and who will shortly publish a description of it.

The views from Chaney Glacier down the Belly River valley, and for miles southeastward, beggar description. The editor of "Forest and Stream," who has visited the regions a little east of the trail followed by our party, calls that part of the Rockies "The Crown of the Continent." It surely is a most appropriate title. I have never seen elsewhere, either in the Rockies, the Cascades, the Sierras, or the Alps, mountain scenery surpassing in real grandeur that which forms "The Crown of the Continent." It is safe to assert that this locality offers as interesting and inspiring an opportunity for adventure and original discovery as can be found in any other region between South America and Alaska.

Bibliography.

Les Alpes Françaises: I. Les Montagnes, les Eaux, les Glaciers, les Phénomènes de l'Atmosphère; par Albert Falsan. Avec 52 figures intercalées dans le texte. II. La Flore et la Faune, le Rôle de l'Homme dans les Alpes, la Transhumance; par Albert Falsan, avec la collaboration de MM. G. de Saporta, Dr. A. Magnin, Cl. Rey, C. Chantre, et A. Locard. Avec 77 figures intercalées dans le texte. Paris: Bibliothèque Scientifique Contemporaine, Librairie J.-B. Baillière et Fils, Rue Hautefeuille, 19, près du Boulevard Saint-Germain. 1893.

Under this title, M. Albert Falsan, of Lyons, the foremost glacialist of France, has given, in two small volumes, very instructive and entertaining descriptions of the western or French portion of the Alps, extending his work also to embrace a general consideration of the principal features of this entire mountain system in its extent through Switzerland and portions of Italy, Germany, and Austria. The first volume treats of the geography and geology of the mountains, of their lakes and rivers, their glaciers, and their climatic phenomena. In the second volume M. Falsan has the aid of several friends, specialists in paleontology, botany, and zoölogy, who treat of the past and present flora of the Alps, of their fauna, and of the changes which the mountains have experienced through man's agency.

The extent and chief divisions of the Alps, their geologic formations, and notes of the altitudes and contour of the principal mountain masses and peaks, are the subjects of the first chapter. How they were uplifted or given their great height above the lowlands of France and Germany and above the shores of the Mediterranean, is next considered. The Mesozoic and Tertiary strata, which were laid down on a nearly level sea bottom, have been pressed into great folds and uplifted in ridges of two to three miles' vertical height above the sea. Subsequent atmospheric and stream erosion often has revealed sections where the overturning of the folds has placed the newer and originally higher beds of rock beneath those on which they were at first deposited. The erosion of these folded strata commonly forms the sharpest peaks, whose outlines have suggested their names as needles, horns, or teeth. Intruded here and there into the central portions of the most compressed and uplifted areas are eruptive granites, bordered by metamorphic schists; and the erosion of these rocks has given more massive and sometimes dome-like forms, of which Mont Blanc, the sovereign of the Alps, is the best example.

Details of the geology of the French or western Alps, their folds, eruptive rocks, rare and interesting minerals, and mining resources, are presented in the third chapter. Next we have a full statement of their geographic groups, culminating summits, subordinate ranges and foot-hills, and the principal passes. After this come a careful description of the river systems of this part of the Alps, a classification of the lakes, and notes on the waterfalls, on subterranean streams forming grottoes or caverns, and on the mineral and thermal springs.

In the sixth chapter, comprising fifty-seven pages, M. Falsan concisely describes the glaciers of the entire area of the Alps, and reviews the progress of our knowledge of their movements and transportation of drift, as made known by the investigations of Agassiz, Forbes, Tyndall, and others.

The two remaining chapters of the first of these volumes treat of the climate of the Alps; of the subaerial erosion and weathering of the rocks due to rains, snows, and frost; of the joint effects of glaciers and streams of water in the production of valleys and lakes; and of the secular recessions and re-advances of the ends of the glaciers. During the early part of this century the glaciers generally advanced slowly somewhat beyond their former limits; from 1850 to 1870 they remained stationary or retreated; but again since 1875 there has been a new period of slight advance.

Taking up the development of plant and animal life in the Alps, M. Falsan begins the second volume with a discussion of their ancient flora, its modifications by the accumulations of perennial snow forming the névés and glaciers, and the present flora of the highest areas. The Marquis de Saporta next contributes a valuable review of the successive fossil floras of this region, from the Carboniferous period to the Pliocene period, immediately preceding the Ice age; and Dr. Antoine Magnin, in seventy-two pages, describes the varied flora now found in the several districts of the French Alps, in their lower, subalpine, and alpine portions.

M. Falsan continues with a review of the faunas found fossil in the rocky strata, and with an account of the present vertebrate fauna. According to Tschudi, the Swiss Alps have nearly 500 vertebrate species, comprising about 30 reptiles, 50 fishes, 60 mammals, and 330 birds; and probably the western Alps have similar numbers. MM. Rey, Chantre, Falsan, and Locard describe the species of insects and of mollusks peculiar to the mountains.

Lastly, the Marquis de Saporta writes of human history in the Alps, from prehistoric man using stone implements, at first rudely chipped, later often polished, to the ages of bronze and of iron. with very brief notice of the passage of armies across these mountains in the times of Hannibal, Cæsar, and the Roman emperors, and the changes of their population during mediæval and modern times. For the last five centuries, at least, the diminution of the forests of the Alps has attracted the attention of legislators, and especially within the past twenty or thirty years much progress has been made in reforesting and in improving the grassy sward of the mountain slopes. Historical researches by M. Charles de Ribbe show that during an equally long time the practice of leading vast herds of sheep from distant lowlands to the high mountain pastures and keeping them there during the summers has been a principal cause of this decrease of the forest, and of a marked deterioration in the quality of the pasturage. which often is too closely cropped. It is estimated that at present fully 350,000 sheep come thus to feed during the warm season on the alpine pasturage. As a result, the areas trespassed upon by the nomadic herdsmen have been abandoned by many of the hardy and thrifty mountaineers who had made their permanent homes on the fertile mountain sides and in the deep, beautiful valleys.

These little volumes present rather the scientific than the poetic and æsthetic aspect of the mountains. They are, however, very attractively written and amply illustrated. Tourists in the Alps will find them most useful companions of travel, scarcely too large to be conveniently carried in a coat-pocket, yet constituting a well-arranged thesaurus of information concerning the geography, geology, and natural history, not only of the Alps in France, but also of their broader and longer, though not higher, extension eastward.

Surveying the French Alps from Mont Blanc, on the eastern boundary of France, one sees the limits of this area at the lake of Geneva on the north and along the valley of the Rhone from Geneva westward to Lyons and thence southward to the Mediterranean Sea, 200 miles or about 320 kilometers distant on the dim southern horizon. The maximum extent of the French Alps from east to west, in Provence, adjoining the Mediterranean, is about 200 kilometers, and from south to north they reach about 350 kilometers. Their geographic subdivisions, according to M. Falsan, are nine in number. In their order from north to south, Savoy, Dauphiny, and Provence have each on the west their Little Alps, and farther east their Great Alps. On their eastern borders, adjoining Switzerland and Italy, are, in the same order, the Graian Alps, towering upward to Mont Blanc, 4,810 meters, or 15,780 feet, above the sea; the Cottian Alps, or Mont Cenis range, of which the dominant central peak, though not the highest, is Mont Thabor, at 3,205 meters; and the Maritime Alps, culminating in Mont Viso, with an altitude of 3,845 meters.

No other complicated mountain region in the world has had its topographic features so elaborately mapped, and its geologic structure so fully explored, as the Alps along all their extent of about 600 miles from the valley of the lower Rhone to the Danube in the vicinity of Vienna. In comparison with the White Mountains of New Hampshire, the Adirondacks in New York, and all the Appalachian mountain belt southward to its highest peaks in North Carolina, the Alps are very young. Their chief uplifting and folding took place during the middle and later portions of the Tertiary era, though very probably they had been preceded in earlier eras by lower mountain tracts of smaller extent. In general, the age and history of the Alps are similar with those of the Rocky Mountains and of the broad Cordilleran belt stretching from Mexico to Alaska and occupying the western third of the United States.

The great orogenic movements producing these corrugations of the North American continent have continued, however, to a later time than those in Europe. Professor Russell's observations show that probably after the end of the Tertiary era mountain-building by faulting and overthrusts formed the lofty range that culminates in Mt. St. Elias and its higher neighbor twelve miles to the northeast, which he has named Mt. Logan, for Sir William Logan, the founder of the Geological Survey of Canada. The latter is the highest mountain of North America, excepting possibly some other summit which remains unmeasured in the St. Elias region; for the three peaks of Mt. Logan, recently computed from triangulation, are found to be 19,497 feet, 19,514 feet, and 19,255 feet above the sea (Am. Geologist, vol. xiii. p. 292, April, 1894). In volcanic action, with outpoured lavas covering an area of about 200,000 square miles on the plains of the Columbia and Snake rivers, east to the Yellowstone National Park, and along the Cascade range and southward to Mt. Shasta and Lassen Peak, as well as in this very late uplift of the St. Elias range, our North American mountains surpass the Alps. But to these grandest mountains of Europe, with their magnificent glaciers, more than fifty years ago so fruitfully studied by Venetz, Charpentier, Rendu, Forbes, Guyot, and Agassiz, we are indebted almost entirely for the first explanation of the origin of the glacial drift, and for the earliest conception of the now fully demonstrated Ice age, the latest and strangest chapter of geologic history.

Mountain-building by plication, with great thickening and upheaval of the upper portion of the earth's crust, and mountain-sculpture by rains, rivers, and glaciers, are both admirably exhibited in the Alps. During their times of uplift and onward to the present day, the sculpture of their forms in spires, domes, buttressing spurs, ravines, and great valleys, has been unceasingly in progress. The most rapid growth of this mountain system belonged to the later part of the Tertiary era. Concomitant erosion was rapid then, and it has continued at probably no less rate through the Quaternary era to its present stage. It will continue until these mountain giants are worn down to as low altitude as the old Appalachian ranges. Indeed, were not the uplifting of each of these mountain belts renewed occasionally during successive geologic periods, they must each within a moderate time, as compared with the earth's long past eras, be almost wholly carried away by the rivers into lakes, lowland plains, and the ocean, so that in their place would remain only low hills, or a peneplain of denudation, with slight height above the sea.

W. U.

THE DOMINION OF CANADA, WITH NEWFOUNDLAND AND AN EXCURSION TO ALASKA. Handbook for Travellers. 250 pages, with 10 Maps and 7 Plans. Leipsic: Karl Baedeker. 1894. Price, $1.50.

Just as the Appalachian Mountain Club begins its explorations of Canada; just as we all begin to realize that our continent can furnish scenery in grandeur equal to that of Europe, and that what the United States cannot supply of beauty and sublimity in natural scenery Canada can, opportunely comes this book to guide and instruct us.

In his search for new worlds to conquer, Baedeker fitly follows his United States (reviewed in APPALACHIA, Vol. VII. No. 2) with his Canada; and the publication of the two cannot fail to attract to our continent many tourists from the one across the sea.

Mr. J. F. Muirhead, author of the "United States," is the editor; and the book bears evidence of his careful and conscientious labors, making this latest addition to the Baedeker series well up to the standard.

It is pleasant to find that, if all roads do not lead to Boston, many routes to Canada have Boston as their point of departure, and, *en route*, New England cities and towns have mention.

"The Provinces," as we call them, receive much attention, a third of the book being given to them; and familiar excursions in New Brunswick, Nova Scotia, Prince Edward's Island, etc. are thoroughly described. Credit is given to Mr. Charles Dudley Warner's "Baddeck," but his "perfectly uncalled-for merriment" is quite shocking to the dignified and precise Baedeker.

The volume is even more than the usual Baedeker, a "much in a little" compendium, and deserves a place in every library.

A. S. P.

SPELUNCA: BULLETIN DE LA SOCIÉTÉ DE SPÉLÉOLOGIE. Première Année, No. 1, Jan.-Mars, 1895. Paris.

The active interest which has been taken for so many years by M. E. A. Martel, of Paris, in the study and exploration of caves has within the past year borne fruit in two ways, — the formation of a Société de Spéléologie, and the publication by this Society of a bulletin with the above title.

The interest which M. Martel has taken in his pastime has been abundantly evidenced by his numerous pamphlets and his two volumes. His example and energy have raised for him many disciples, not a few of whom have been his aids in matters of exploration. Late in 1894 the interest which had arisen in his work and that of his friends manifested itself in a call for a meeting of those interested in the subject, which was held in November, 1894, sixty-four persons being present. Upwards of one hundred and twenty persons having signified their desire to aid in the formation of a society for cave exploration, an organization was effected early in 1895 and the new society incorporated.

At the meeting of organization, a form of constitution was adopted, and one very sensible decision was made,— one referring to the orthography of the Society's name. According to its derivation, the word should be *spélæontologie*; but, following the lead of other sciences, paléontologie among them, a step was taken towards the unification of scientific orthography, and the official name, Société de Spéléontologie, was adopted.

Early in the year the new Society had as many as one hundred and fifty names on its roll, with officers whose attainments in their special line of work have long been known in this country. F. Deloncle is the President; Dr. Raphael Blanchard, the well-known naturalist, and J. Vallot, Vice-Presidents; E. A. Martel, General Secretary; E. J. Parisot and A. Viré, actual Secretaries; and G. Gaupillat, Treasurer.

At an early meeting measures were taken to preserve valuable papers through the publication of a magazine, and accordingly "Spelunca" was established as the official organ of the association. This is a quarterly, which presents, first, an account of the meetings, then abstracts of the important papers presented, and, finally, *Informations et Chronique*, a collection of extracts from other publications touching caves or cave exploration. The amount of such material is really quite surprising.

As to the Society itself, its regulations admit of members in any portion of the world, and it will be glad to welcome to its ranks all who are interested in its especial subjects. The home of the Society is in Paris, No. 7 Rue des Grands Augustins.

J. R.

BIBLIOGRAPHICAL NOTES.

ALTHOUGH Holland and Belgium do not lay claim to the distinction of having important mountains of their own, there is in these countries nevertheless sufficient interest to maintain an Alpine club at Brussels and flourishing geographical societies in others of the larger cities.

The Tijdschrift, as it is termed, of the Royal Geographical Society of Holland, a periodical which forms a bulky volume of several hundred pages each year, gives an interesting review of geographical topics as seen from the standpoint of the Dutch.

There was a time when this nation was a leader on the seas, and had carried its flag in exploration into the most distant corners of the earth; and this instinct is by no means obsolete The Geographical Congress in London in the summer was a matter of the greatest interest to all caring for the study; and with the turn towards Africa which accompanied the appearance of Slatin Pasha, the Dutch were particularly at home, for the Dark Continent has been one of their favorite countries. The recent issues of the Tijdschrift have therefore had an African tinge, containing as they do a long and excellent account of the proceedings of the Congress and other items of like interest. In the October issue Colonel F. DeBas contributes a traveller's account of a trip along the Congo; while a preceding number contains a description of an exploration in Toba-land by Van Dijk, an article which is accompanied by an excellent map.

A feature of this publication is its excellent bibliographies of current geographical publication, especial attention having been given of late to a consideration of works for educational purposes.

The Club Alpin Belge, which was established in 1883, has been actively at work, and has published its Bulletins quite frequently, the number of them being already about twenty-five. As might be expected, ascents in other countries form quite a considerable portion of the subjects for articles, these ascents ranging from Norway, through the Alps, and including Algeria and Spain and the larger islands of the central Mediterranean.

The Société Royale de Géographie d'Anvers is an institution of greater age than its fellow just named and rejoices the present year that its twentieth birthday is at hand, being in respect to age but a few months the junior of the Appalachian Mountain Club. Its Bulletin, of which four or five issues appear each year, concerns itself quite a little with local geography. A current article is a consideration by the President, Lieutenant-General Wauwermans, of the condition of Antwerpian cartography in the sixteenth century. The paper, which is one continued from Bulletin to Bulletin and now nearly finished, is particularly notable in its minute view of the subject under consideration, the life stories of the cartographers being recited in all their detail, with accounts of the work of these men, of whom we at this distance have little knowledge save of Mercator and Ortélius.

The Bulletins present accounts of the meetings of the Society, which are interesting in many ways, and preserve the more important of the papers which are read on these occasions.

Of the French societies the Club Alpin Français is particularly active, not only in its Direction Centrale, but in its branches, of which there are about a score. The Bulletin Mensuel contains notes not only of the business matters of the parent club, but of the branches, giving interesting information about meetings, excursions, ascents, etc., together with plans for the coming seasons. The Section of Lyons presents a list of the ascents above 3,000 meters (9,842 feet), made by members of the Club. There are some thirty persons mentioned who made these ascents, including a lady, Mlle. Lascharrière; and some forty peaks of this altitude were climbed.

Among the latest of the Bulletins of the Sections to be received may be mentioned that of the Section des Alpes-Maritimes, which has just published its fifteenth annual brochure. The headquarters of the Club are at Nice, and there is ample opportunity for the exercise of its functions in mountains quite near at hand. Its members, however, find much pleasure in the Alps, and no small portion of the papers are with reference to those peaks. Of particular interest to the reviewer is the account by M. V. de Gorloff of an ascent of the Jungfrau from Grindelwald. It has especial interest to the reviewer in that it is the track over which he himself passed some twenty years since; and the enthusiasm of the Frenchman over the ascent, the hut of the Bergli, the rock, Kalli, and the grand crevasses of the Aletsch glacier bring back memories of his own trip, which so far as speed is concerned seems to have been accomplished from point to point in almost precisely the same length of time. Other articles, including "La Cima di Jazzi" and "Les Carpathes de Bulovine," testify to the activity of this organization.

Of the geographical societies of France there are indeed quite a number, some of them denoting by their name that their interest lies in the commercial aspects of the science.

The Société de Géographie of Paris presents a bulletin four times a year which includes in every issue interesting and readable articles. In the latest Bulletin an account is given of the prizes awarded by the Society, nine gold medals having been presented to explorers and cartographers, while four silver medals and two other prizes were awarded for divers other researches or achievements. The issue is devoted to reports concerning the different awards, presenting in full the two principal papers upon which medals were awarded. One of these relates to the scientific explorations of Lieutenant Louis Mizon in various parts of Africa. Another important paper by Lieutenant R. Bluzet is an exposition of explorations in Timbuctu, so that this bulletin as well as that of the Dutch Society has a most decidedly African tinge. The papers are illustrated by plates and maps.

Egypt has also its geographical society, Société Khédiviale de Géographie, which prints its Bulletin, a very neat publication, in the French language. A recent issue presents a paper by Slatin Pasha, in which he speaks of his experiences with General Gordon, — a paper which has additional interest from the portrait, which accompanies it, of the man so long time held prisoner in the Soudan.

The work of the Italians in geography and alpinism is by no means to be overlooked, for there are a number of societies in that country which are active in their work and give evidence of the same through their publications.

The Club Alpino Italiano, which has its headquarters in Turin and branches in other places, issues each year a bulky annual which is filled with interesting articles. The most recent of these bulletins presents a biography of the astronomer, Father Denza, who, it would seem, had an interest aside from his telescope and his instruments in the study of terrestrial magnetism. The mountains which these Italian alpinists have to study are the marvel of visitors to their country; for they have not only the Alps as known to us, but those other charming groups in the Dolomites and the long ranges of the Apennines. Little wonder, then, that they can have a society whose membership rises into the thousands, and whose members present papers filled with interest to all who can read the language.

As a means of more quickly acquainting their members with their plans, the business transacted at their meetings and such matters of interest, a Rivista Mensile is also published, and now forms some fourteen volumes.

J. R.

Report of the Recording Secretary for 1895.

On January 1, 1896, the corporate membership of the Club was 881. The losses amounting to 76, and the accessions to 79, and two memberships having been revived, the net gain for the year was five. The Honorary Members numbered 16, Professor James D. Dana having deceased during the year; the Corresponding Members numbered 51, Mr. R. H. Budden having deceased. There were 82 Life Members. The total membership was 948, a gain of three.

There were held during the year nine regular and three special meetings, and one field meeting; the average attendance being 112. Seven of the thirteen meetings were held in the evening. At these meetings there were presented five reports and twenty-five papers, ten being illustrated with lantern views. British Columbia, the scene of the long summer excursion, was favored with ten papers; and Mt. Desert. where the Field Meeting was held, had three. The two summer trips thus monopolized more than half the meetings; variety, however, was afforded by two papers each from the White Mountains, Greenland, and Hawaii, and one each from Nova Scotia and Japan. In 1895 the Sierras, Alps, and Himalayas were overlooked. Three papers were of such a general scientific and æsthetic character that they cannot be located anywhere, while one paper cannot be located short of another planet, Mars.

A successful field meeting was held at Seal Harbor, Mt. Desert, Me., July 1–8, and a notable excursion made to the Canadian Rockies and Selkirks. Accounts of these and other excursions will be found in the report of the Excursion Committee.

The Snow-shoe Section held its annual meeting in January. The season was good, and quite a number of meets were enjoyed. The winter excursion was to the Oxford, at Fryeburg, Maine, in the latter part of February. The attendance was over 60, and many walks and climbs were enjoyed.

The annual social meeting was held at the Hotel Vendome, on Friday evening, February 15. Two hundred and eight tickets were sold.

One number of APPALACHIA has been published —Vol. VII., No. 4, in June. A Guide and also a Map of the Country about Boston are in course of preparation.

Three new features of Club work mark the year 1895.

For the first time in the Club's history we have undertaken explorations outside of our Appalachian system of mountains, and it is to be hoped that the work in British Columbia is but a beginning, that many new ascents will be recorded to the credit of our Club, and that much grand and beautiful scenery will be described for the first time at our Club meetings.

During the year our Councillor of Art has adorned the walls of a room in one of Boston's schools with pictures illustrating the scenery of America.

Lastly, our Trustees of Real Estate have made their first purchase of forest lands in New Hampshire. In addition to the Madison Spring Hut we now own a tract of timber land along Snyder Brook in Randolph. We trust that this good work may be extended by our Club.

Respectfully submitted,
ROSEWELL B. LAWRENCE,
Recording Secretary.

Report of the Corresponding Secretary for 1895.

THERE must be, year after year, a similarity between the reports of the Corresponding Secretary, since his duties are in the main in connection with the library, acknowledging receipt of publications, requesting exchanges, and the like.

The number of corresponding societies and institutions has been increased to about seventy. The number of publications received during the past year does not differ materially from that of the preceding year. As in previous years, a few periodicals which cannot be acquired by exchange, but which must be purchased, have been secured through the kindness of Mrs. J. H. Thorndike, who has contributed to a fund for this purpose. A detailed list of accessions follows this report, from which it will be seen that some 100 volumes have been added to the library by exchange, and 24 volumes and pamphlets acquired through gift of the author; some 27 volumes have also been purchased during the year, principally towards the filling of different departments of the library. A few needed works have been added to the botanical shelves, and some gaps in the publications on mountains in our own and other countries have been made less notable.

A very excellent Bulletin published by the Providence Public Library, in September, 1895, contains a bibliography of the White Mountains prepared by Mr. George Thomas Hart. An inspection of the titles contained in the list shows a gratifying percentage of works published by our Club and its members, and which are to be found upon our shelves. It is probable that during the coming year some of the works still lacking will be secured.

Some of the important books on mountains published during the year have not yet found a place in the library, their issue having been comparatively late in the season, when but little of the appropriation for library purposes remained available. It is hoped, however, to supply these books early in the coming year.

From various sources, principally the United States Geological Survey and the Topographical Survey of Canada, the maps have been increased by 59 accessions.

During the past year the library of the Club has been made useful in a new way, for purposes of general education. An exhibition of educational material pertaining to geography was made in the drill hall of the English High School, in Boston, on December 7, 1895, under the care of Mr. Frank F. Murdock, of Bridgewater. To this exhibition the Club contributed both from its library and its Art department. Nearly one hundred volumes were loaned for the occasion; these were to a large extent foreign publications, since the publishers in this country contributed sets of their own works. Of the volumes loaned, some sixty were the Proceedings or Bulletins of foreign societies, nine languages being represented; a few were of the less common American publications, and about a dozen were guide-books of different lands, showing the excellence of these works as an adjunct to the study of geography; some twenty-five were miscellaneous volumes, travels, mountain ascents, and the like, including a few volumes of poetry.

The following report of the exhibition has been kindly transmitted to me by Mr. Murdock: —

> "On December 7, 1895, there was held at the English High School in Boston a quarterly public meeting of the New England Conference of Educational Workers. The subject was *Geography and its Relation to Nature Study.* The speakers of the morning were W. A. Munroe, of California, on 'Geography in German Schools,' and F. F. Murdock, of Bridgewater, on 'Some Characteristics of the New England Geography.'
>
> "In the afternoon A. C. Boyden, of Bridgewater, and Mr. Scott, of Oswego, N. Y., spoke on 'Relation of Geography to Nature Study.'
>
> "In the drill hall there was an exhibit of geographical apparatus, including the publications of the leading educational firms, loan collections from the Chelsea, Boston, and Bridgewater normal schools, and the Appalachian Mountain Club. The Club displayed copies of the several geographical magazines and bulletins, its own publications, and albums of photographs, all of which attracted much attention. Upwards of five hundred running feet of frame space and an equal amount of table space were devoted to maps, charts, pictures, globes, lanterns, books, and railroad pamphlets. The exhibit was in every way most successful."

Last year the nucleus of a collection of poetry on Nature and the mountains was formed, and the volumes of this kind issued during the year have been purchased. The most considerable addition of volumes during the year has been in that department of literature which is so new that one or two of the great systems of library classification do not make provisions for it at all, — the popularization of Nature. A complete set of the books of Frank Bolles, those of John Burroughs, Bradford Torrey, Olive Thorne Miller, and other writers in the same field have been added.

The library is in a reasonably prosperous condition; it contains, with few exceptions, the magazines and publications lying within its special department. Several serial volumes have been bound during the year, perhaps at the expense of the books recently published. A constantly increasing use of the books for home reading is noticeable, and the frequent calls for volumes not on the shelves and requests for notice of the return of volumes which are out indicate an increasing interest on the part of members of the Club in its library.

Respectfully submitted,

JOHN RITCHIE, JR.,
Corresponding Secretary.

ACCESSIONS TO THE LIBRARY FOR THE YEAR 1895.

FROM CORRESPONDING SOCIETIES.

American.

Academy of Natural Sciences of Philadelphia. — Proceedings, 1894, Part 3; 1895, Parts 1, 2.

American Geographical Society. — Bulletin, XXVI. 4, Parts 1, 2; XXVII. Parts 1-3.

American Museum of Natural History. — Annual Report, 1894; Bulletin, 1894, VI.

California Academy of Sciences. — Proceedings, 2d ser. Vol. IV. Part 2; Vol. V. Part 1; Vol. VII. Part 1.

Cambridge Entomological Society. — Psyche, Vol. VII. 226-236.

Essex Institute. — Bulletin, Vol. XXVI. 4-6, with Geological map of Essex County, Mass.

Geographical Club of Philadelphia. — Bulletin, Vol. I. Nos. 1-5.

Geological and Natural History Survey of Canada. — Annual Report, VI., 1892-3; Report of Progress, 1875-6, '76-7, '77-8, and maps, '80, Parts 1, 2, and maps; Figures and Descriptions of Canadian Organic Remains, Decade I.-IV.; Descriptive Sketch of the Physical Geography and Geology of the Dominion of Canada; Mesozoic Fossils, Vol. I. 1-3; Contributions to Canadian Palæontology, Vol. I. 1, 3, 4; III.; Report on the Geology and Resources of the vicinity of the 49th Parallel, etc.; Contributions from the Herbarium of the Geological Survey of Canada, 1-4; Palæozoic Fossils, Vol. I.; II. Part 1; III. Part 1; Contributions to the Micro-palæontology of the Cambro-Silurian Rocks of Canada, 1-4; Catalogue of Canadian Plants, Part 1; The Fossil Plants of the Erian and Upper Silurian Formations of Canada, Part 2; Descriptive Catalogue of a Collection of the Economic Minerals of Canada; The Mineral Wealth of British Columbia; Notes on the Shuswap people of British Columbia; Descriptive notes on certain implements, weapons, etc., from Graham Island, etc.; 26 maps.

Geological and Natural History Survey of Minnesota. — Annual Report, XXII.; XXIII.; Bulletin, 7; 9, Parts 2–7.

Lick Observatory. — Publications, Vol. IV.

National Geographic Society. — Vol. VI. pp. 179–291, Plates 10–15.

New Hampshire Historical Society. — Proceedings, Vol. II. Part 4.

Sierra Club. — Bulletin, I.; Part 5; Table of elevations.

Smithsonian Institution. — Diary of a Journey through Mongolia and Tibet in 1891–2; Archæologic Investigations in James and Potomac Valleys; The Siouan Tribes of the East; Chinook Texts.

Torrey Botanical Club. — Bulletin, XXI. 12; XXII. 1–11.

United States Department of Agriculture. — Annual Summary of the New England Weather Service for 1894; Annual Summary of the Monthly Weather Review, XXII.; Bulletin of the New England Weather Service, 1895, 35–45; Monthly Weather Review, Sept.–Dec., 1894; Jan.–July, 1895.

United States Geological Survey. — Annual Report, XIV. Parts 1, 2; Bulletin, Nos. 118–122; Monographs, XXIII., XXIV.; Atlas sheets.

Foreign.

Club Alpin Belge. — Bulletin, No. 21.

Club Alpin Français. — (*Direction Centrale*) Annuaire XXI.; Bulletin, 1894, 12; 1895, 1–11. (*Section des Alpes Maritimes*) Bulletin, XV.; Table générale des quinze premiers bulletins; (*Section Lyonnaise*) Bulletin, VI.; Revue Alpine, 1895, Nos. 2, 3, 6, 7, 10; (*Section du Sud-Ouest*) Bulletin, XXXVI., XXXVII.

Club Alpino Italiano. — (*Direzione Centrale*) Bollettino, XXVIII. 61; Rivista Mensile, XIII. 12; XIV. 1, 2, 4–11.

Club Alpin Suisse. — (*Comité Central*) Alpina, 3^{me} Ann., 1–9, 11–19; Jahrbuch, XXX., and Beilagen; (*Section Genevoise*) L'Écho des Alpes, 1894, 4; 1895, 1–11.

Deutscher und Österreichischer Alpenverein. — (*Central-Ausschuss*) Mittheilungen, 1895, 1–23.

Geological Institution of the University of Upsala. — Bulletin, Vol. I. 1, 2; II. 1.

Gesellschaft für Erdkunde (Berlin). — Verhandlungen, XXI. 9, 10; XXII. 1–7.

Imperatorskoye Russkoye Geographitcheskoye Obshtchestvo. — Izviestiya, XXX. 4–6; Otchot, 1894.

Kais.-königliche Geographische Gesellschaft. — Mittheilungen, N. F. XXVII.

Kruimskiĭ Gornuĭ Klub. — Bulletin, 1895, Nos. 2–6.

Nederlandsch Aardrijkskundig Genootschap. — Tijdschrift, 2^{e} Ser. Deel. XI. No. 8; XII. 1–5.

New Zealand Alpine Club. — Journal, Vol. II. 7, 8.

Österreichischer Alpenclub. — Österreichische Alpen-Zeitung, XVI. 416; XVII. 417–441.

Österreichischer Touristen-Club. — Österreichische Touristen-Zeitung, XIV. 24; XV. 1–23.

Royal Geographical Society. — The Geographical Journal, Vol. V. 1–6; VI. 1–6.

Siebenbürgischer Karpathenverein. — Jahrbuch, XV. and Beilage.

Sociedad Geografica (Madrid). — Boletin, XXXVII. 1–6.

Sociedade de Geographia (Lisbon). — Actas, XIV.; Boletim, 13ª Ser. 9–12; 14ª Ser. 1–3.

Società Alpina Friulana. — In Alto, VI. 1–6.

Società Alpina Meridionale. — Bollettino, III. 1–4.

Società degli Alpinisti Tridentini. — Annuario, XVIII.

Società Geografica Italiana. — Bollettino, VII. 11, 12; VIII. 1–11; Memorie, Vol. V. No. 1.

Société de Géographie (Paris). — Bulletin, XV. 3, 4; XVI. 1–3; Comptes Rendus, 1894, 17–19; 1895, 1–13.

Société de Géographie (Tours). — Revue, 11me Ann. No. 3; 12me Ann. Nos. 1, 2.

Société de Géographie Commerciale (Bordeaux). — Bulletin, 1894, Nos. 23, 24; 1895, Nos. 1–19, 21–23.

Société de Géographie Commerciale (Paris). — Bulletin, XVI. 3; XVII. 1–11.

Société Khédiviale de Géographie. — Bulletin, Ser. IV. Nos. 3–6; Hommage à la Mémoire de S. A. Le Khédive Ismaïl Pacha.

Société Royale de Géographie d'Anvers. — Bulletin, XIX. 3–5; XX. 1, 2; Mémoires, Tome IV.

Svenska Turistförening. — Årsskrift, 1895; Wegweiser des Schwedischen Touristenvereines, Nos. 8, 9, 10.

Teikoku Daigaku (Imperial University, Tokyo). — Calendar, 1894–95; Journals of the College of Science, VII. 5.

Thüringerwald-Verein. — Thüringer Monatsblätter, 2te Jahrgang, No. 4.

Verein für Erdkunde (Leipzig). — Mittheilungen, 1894; Wissenschaftliche Veröffentlichungen, II.

Other Exchanges.

Annalen des Kais.-königlichen Naturhistorischen Hofmuseums. — Annalen, IX. 3, 4; X. 1.

Around the World. — Vol. II. No. 14.

Revue Géographique Internationale. — Vol. XIX. 228–230; XX. 231–238.

Tufts College. — Tufts College Studies, Nos. 1–4.

White Mountain Echo. — Vols. XVI.–XVII.

Donations.

Mont Blanc; with a Memoir of the Author by Edmund Yates. Albert Smith. Gift of *T. T. Woodruff.*

Two New Ferns from New England. Geo. E. Davenport. Gift of Author.

Journal of the Association of Engineering Societies, Vol. X. No. 7. Gift of *L. F. Cutter.*

Annals of Harvard College Observatory, XLI. 2. Gift of Observatory.

La Micrographe Préparateur, Vol. II. No. 2.

Report of the Board of Metropolitan Park Commissioners, 1895.

Boletin del Instituto Geográfico, XV. 5–8.

APPALACHIA, Vol. VII. No. 4.

Register of the Appalachian Mountain Club for 1895.

Bulletin de la Société de Spéléologie, I. 1.

Die Verhältnisse der Luftfeuchtigkeit auf dem Sonnblickgipfel. *Julius Hann.* Gift of Author.

Geographische Zeitschrift, Vol. I. No. 1.

Sweden: A Tourist Trip. Gustavus Lindberg.

Geogenetische Beiträge. Otto Kuntze. Gift of Author.

A Journey up the Yukon River. *I. C. Russell.* Gift of Author.

The Mountains of Oregon W. G. Steel. Gift of Author.

Monthly Bulletin of the Providence Public Library, Vol. I. No. 9.

Proceedings and Transactions of the Nova Scotian Institute of Science, Vol. VIII. No. 4. Gift of Institute.

Annual Report of the New Hampshire Forestry Commission, Vol. I. Part 2. Gift of Commission.

Alpine Journal, Vol. XVII. No. 129. Gift of *Mrs. J. H. Thorndike.*

Outing, Vol. XXV. 4–6; XXVI. 1–6; XXVII. 1–4. Gift of *Mrs. J. H. Thorndike.*

Royal Scottish Geographical Magazine, Vol. XI. 1–12. Gift of *Mrs. J. H. Thorndike.*

Projet de Construction d'un Globe Terrestre à l'échelle du Cent-millième. *Élisée Reclus.* Gift of Author.

The Meteorological Observatory on Monte Cimone, Italy; Physiological Effects of High Altitudes. *A. L. Rotch.* Gift of Author.

PURCHASED.

The History of a Mountain. *Élisée Reclus.*

Flowers of the Field and Forest. A. B. Hervey.

Trees and Shrubs of Massachusetts. Geo. B. Emerson. Vols. I., II.

Pocket-Guide to the Common Land Birds of New England. *M. A. Willcox.*

Mountaineering (Badminton Library). C. T. Dent and others.

Handbook of Birds of Eastern North America. Frank M. Chapman.

The First Ascent of the Kasaï. Chas. Somerville Latrobe Bateman.

A Guide to find the Names of all wild-growing Trees and Shrubs of New England by their Leaves. Edward Knobel.

Ferns and Evergreens of New England. Edward Knobel.

The Geology and Extinct Volcanoes of Central France. G. Poulett Scrope.

A Long Vacation in the Argentine Alps. H. C. Ross Johnson.

The Dominion of Canada with Newfoundland, and an Excursion to Alaska. Karl Baedeker.
The Statesman's Year-Book for 1895. *J. Scott Keltie.*
Botanical Miscellany, I.–III. Wm. Jackson Hooker.
Birds in the Bush. Bradford Torrey.
A Rambler's Lease. Bradford Torrey.
A Florida Sketch-Book. Bradford Torrey.
The Foot-path Way. Bradford Torrey.
Little Brothers of the Air. Olive Thorne Miller.
A Bird-Lover in the West. Olive Thorne Miller.
In the Tennessee Mountains. Charles Egbert Craddock.
Chocorua's Tenants. Frank Bolles.
From Blomidon to Smoky, and other Papers. Frank Bolles.
How to Know the Wild Flowers. Mrs. Wm. Starr Dana.

Treasurer's Report for 1895.

RECEIPTS.

Cash on hand, Jan. 1, 1895			$580.13
Life-Memberships: John D. Williams, Wm. S. Rumrill, Gardner Cram, at $30			90.00
Admission fees:			
From 77 new members at $5		$385.00	
Assessments:			
From 2 members for 1894.			
" 672 " " 1895.			
" 4 " " 1896.			
678 members at $3		2034.00	
Interest:			
On Permanent Fund for 1894	$137.65		
" Reserve Fund " "	79.22		
" Treasurer's Bank account	24.83		
		241.70	
Donation:			
From Mrs. J. H. Thorndike, for Library		10.00	
APPALACHIA:			
For sales in 1894		66.69	
Annual Reception:			
For surplus received from the Committee		20.55	
Total Income			2757.94
			$3428.07

PAYMENTS.

Trustees of the Permanent Fund,			
For 3 Life-Memberships		$90.00	
Trustees of the Reserve Fund,			
For interest for 1894 added to the Fund		79.22	
			$169.22
Postage and stationery	$177.25		
Printing and advertising	131.50		
For Club Register for 1895	94.00		
		$402.75	
Clerical services		249.75	
Expenses of meetings		157.05	
Library:			
For books	$47.08		
" binding	81.48		
		128.56	
Room, at No. 9 Park Street:			
For rent	$448.00		
" care, gas, etc.	45.90		
		493.90	
APPALACHIA:			
For Vol. VII. No. 4	$434.00		
" delivery do.	59.25		
" binding and covers	26.07		
" sundries	52.25		
		571.57	
Department of Topography:			
For work on Map of Greater Boston		164.43	
Department of Exploration:			
For exploration in Canadian Rockies		100.15	
Department of Improvements:			
For work on Paths		54.45	
Department of Natural History:			
For thermometer for observing-station at Bethlehem, N. H.		4.00	
Department of Art:			
For photographs and mounting same	$34.99		
" pictures donated for decorating a room in the Hancock Public School in Parmenter Street	57.45		
		92.44	
Amounts carried forward		$2419.05	$169.22

Amounts brought forward	$2419.05	$169.22
Expenses :		
For Club emblems	13.34	
Donation :		
To Trustees of Public Reservations	25.00	
Real Estate :		
For travelling expenses and record fees	50.75	
Total Expenses		2508.14
		$2677.36
Cash on hand, Dec. 31		750.71
		$3428.07

Respectfully submitted,

JOHN E. ALDEN,
Treasurer.

The undersigned have examined the accounts of the Treasurer of the Appalachian Mountain Club for the year 1895. We find proper vouchers for all payments, and have verified the cash on hand, amounting to $750.71.

We have examined the accounts of the Trustees of the Permanent Fund and the Reserve Fund for the year 1895, and they are correct.

The Permanent Fund amounts to $3703.95 and accumulated interest to $138.77.

The Reserve Fund amounts to $2228.19 and interest to $68.92, and the investments as reported by the Trustees have been verified.

Your Committee desires to compliment the Treasurer upon the neatness of his books, and commend his method of keeping the same, by which any item of receipt or payment and its voucher may be found without delay.

GEORGE O. DAVIS,
GEORGE O. SMITH,
RUFUS A. BULLOCK,
Auditing Committee.

BOSTON, January 7, 1896.

RECEIPTS FOR FIRST TWENTY YEARS.

YEAR.	MEMBERSHIPS.					Life Membership.	Sales of APPALACHIA and other publications.	Interest.	Annual Reception.	Field Meetings and Excursions.	Donations.	Total.
	Admission Fees.	Yearly Assessments.	Back Assessments.	Advance Assessments.	Total.							
1876	252.00	....	....	....	252.00	....	43 13	....	....	....	....	295.13
1877	50.00	254.00	8.00	....	312.00	....	98.00	....	....	....	....	410.00
1878	54.00	264.00	....	....	318.00	60.00	75.70	....	....	....	43.00	496.70
1879	148.00	256.00	40.00	4.00	448.00	....	130.85	1.90	....	....	221.70	802.45
1880	178.00	332.00	24.00	4.00	538.00	90.00	116.90	10.79	....	....	86.21	841.90
1881	222.00	384.00	18.00	12.00	636.00	120.00	141.40	17.59	....	....	62.55	977.54
1882	256.00	528.00	74.00	....	858.00	90.00	309.43	22.07	....	....	2.00	1281.50
1883	395.00	1000.00	20.00	27.00	1442.00	210.00	197.58	39.72	9.72	82.88	22.00	2003.90
1884	285.00	1059.00	21.00	9.00	1374.00	60.00	93.51	53.29	26.80	11.47	1.00	1620.07
1885	375.00	1212.00	69.00	12.00	1668.00	60.00	113.19	61.09	.45	70.73	534.50	2507.96
1886	426.00	1317.00	90.00	24.00	1857.00	330.00	247.94	88.62	12.50	124 35	364.20	3024.61
1887	385.00	1491.00	90.00	42.00	2008.00	180.00	183.80	79.34	10.00	40.20	114.00	2615.34
1888	355 00	1536.00	117.00	12.00	2020.00	180.00	67.06	42.52	9.20	45.94	754.76	3119.48
1889	655.00	1617.00	69.00	27.00	2368.00	120.00	93.85	151.29	11.48	....	127.60[1]	2872.22
1890	450.00	1620.00	24.00	15.00	2109.00	150.00	1168.13	217.12	3.73	....	220.85	3868 83
1891	500.00	1743 00	12 00	9.00	2264.00	120.00	354.28	182.54	....	146.27	20.00	3087.09
1892	560.00	1830.00	15.00	9.00	2414.00	300.00	625.22	130.29	....	70.58	.50	3540 59
1893	480.00	1908.00	6.00	....	2394.00	300.00	20.97	431.90	....	13.57	454.50	3614.94
1894	640.00	1968.00	9.00	12.00	2629.00	210.00	407.30	21.65	....	14.04	22.25	3304.24
1895	385.00	2016.00	6.00	12.00	2419.00	90.00	66.69	241.70	20.55		10.00	2847.94
Total	7051.00	22335.00	712.00	230.00	30328.00	2670.00	4554.93	1793.42	104.43	620.03	3061.62	43132.43

[1] Including $3.00 for keys.

EXPENDITURES FOR FIRST TWENTY YEARS.

YEAR.	Permanent Fund.	Reserve Fund.	Stationery, Postage, and Printing.	APPALACHIA and other Publications.	Department of Topography.	Improvements and Explorations.	Natural History and Art.	Clerical Expenses.	Expenses of Meetings.	Library.	Club Room.	Donations.	Total.
1876	....	....	109.91	140.86	....	15.00	....	....	....	....	....	....	265.77
1877	....	....	60.65	364.13	....	....	13.45	....	....	....	....	....	438.23
1878	....	....	202.31	169.80	2.00	20.00	52.48	....	....	....	....	....	446.59
1879	60.00	....	162.31	347.92	19.20	158.76	....	....	....	....	....	....	748.19
1880	90.00	....	186.17	318.13	19.00	72.60	....	....	....	....	....	....	685 90
1881	120.00	....	394.09	246.23	37.95	68.00	....	19.75	22.70	....	....	....	908.72
1882	90.00	....	258.99	675.93	25.40	....	....	34.50	25.00	....	....	....	1109.82
1883	281.72	....	389.73	366.27	23.65	160.37	....	67.41	1.38	69.78	....	....	1360.31
1884	113.42	....	382.49	1176.53	....	21.00	....	57.62	....	58 10	....	....	1809.16
1885	86.48	....	363.27	361.31	229.00	102.00	....	106.00	53.06	72.50	284.17	25.00	1682.79
1886	270.00	....	432.38	932.91	77.73	46.00	74.00	121.45	171.15	131.72	667.30	49.88	2974 52
1887	388.38	1000.00	289.38	566.71	538.97	123 02	20.12	107.12	145 45	102.50	504.81	....	3786.46
1888	280.00	100.00	473.95	597.59	....	779.55	8.32	49.50	93.45	120.56	456 12	....	2959.04
1889	220.00	114.70	390.77	1127.91	7.20	118.58	86.76	123.75	68.86	67.33	487.34	....	2813 20
1890	283.48	48.59	463.43	1682.95	....	46.07	101 56	181.00	58 35	96.06	464.95	....	3426.44
1891	305.64	605.71	389.27	833 17	50.00	123.00	45.36	191.50	121.60	117.10	471.69	105.30	3359.34
1892	399.56	200.00	438.72	1059 89	216.33	46.60	122.39	197.50	133 95	113.45	534.08	61.34	3519.81
1893	415.27	74.97	446.07	1086.18	....	684.15	664.45	221.95	203.70	59.10	576.04	25.00	4456.88
1894	214.00	....	398.49	947.59	....	228.75	74.48	236.80	194.14	89.66	540.28	25.00	2949.19
1895	90.00	79.22	402.75	571.57	164.43	205.35	109.78	249.75	157.05	128.56	493.90	25.00	2677.36
Total	3707.95	2223.19	6635.13	13573.58	1410.86	3018.80	1373.15	1965.60	1449.84	1226.42	5480.68	316.52	42381.72

Report of the Trustees of the Permanent and Reserve Funds for 1895.

PERMANENT FUND. — PRINCIPAL.

1895.			
January 9.	Amount on deposit in Suffolk Savings Bank, Book No. 100,753	$1,485.78	
	Amount on deposit in Provident Institution for Savings, Book No. 118,265	1,142.27	
	Amount on deposit in Lexington Savings Bank, Book No. 1,921 . . .	985.90	
	Total on hand Jan. 9, 1895, as per last account . . .		$3,613.95
	Amounts received from J. E. Alden, Treasurer, for Life-Memberships during the year :		
March 11.	John D. Williams	$30.00	
" "	William S. Rumrill	30.00	
November 8.	Gardner Cram	30.00	
			90.00
	Total Principal on hand Jan. 8, 1896		$3,703.95

PERMANENT FUND. — INTEREST.

Interest on deposit in Suffolk Savings Bank for twelve months, to October, 1895, at 3½% . . .	$52.44	
Interest on deposit in Provident Institution for Savings for twelve months, to July, 1895, at 3½% . .	40.31	
Interest on deposit in Lexington Savings Bank for six months, to April, 1895, at 5%	24.62	
Interest on same for six months, to October, 1895, at 4%	20.20	
Interest on deposit Eliot Five Cents Savings Bank for six months, to October, 1895	1.20	
Total Interest on hand Jan. 8, 1896		$138.77

RESERVE FUND. — PRINCIPAL.

1895.			
January 9.	Loan to the Massachusetts Loan and Trust Co.	$1,414.19	
	Deposit in Five Cents Savings Bank, Book No. 229,173	809.00	
	Total Principal on hand Jan. 8, 1896		$2,223.19

Reserve Fund. — Interest.

Interest on Loan to Massachusetts Loan and Trust Co. for twelve months, to January 1, 1896	$42.42	
Interest on deposit in Five Cents Savings Bank for twelve months, to October, 1895, at 4 and 3½ % . .	26.50	
Total Interest on hand, Jan. 8, 1896		$68.92
Total Permanent Fund of Principal and Interest		$3,842.72
Total Reserve Fund of Principal and Interest		2,292.11
Total Amount in the hands of the Trustees		$6,134.83

CHARLES H. FRENCH, ⎫ *Trustees of Per-*
ISAAC Y. CHUBBUCK, ⎬ *manent and Re-*
REST F. CURTIS, ⎭ *serve Funds.*

BOSTON, Jan. 9, 1896.

Report of the Trustees of Real Estate.

To the President and Members of the Appalachian Mountain Club:

YOUR Trustees of Real Estate report that, in the early portion of the year, we arranged with Mr. Laban M. Watson, of Randolph, in the State of New Hampshire, for the purchase from him of a strip of his land on Snyder Brook and the path up Mt. Madison. We were led to make this purchase because of information, suddenly received in the month of January, that Mr. Watson had begun the cutting of his timber, and that, without immediate action on our part, the beauty of the surroundings of the Madison Path would be largely, if not altogether, destroyed. After an examination of the titles in Lancaster, a deed was taken from Mr. Watson, his wife, and his mother, with releases from other persons and corporations having interests therein; which deed, recorded on the thirteenth day of June last, conveyed to the Club a strip, six hundred feet wide, running south from the railroad location as far up the mountain as the northern boundary line of the second range, a distance of nearly half a mile. In this strip are contained two cascades, the lower of which is known as the Gordon Fall, and other places of attractive scenery, with the path and the brook along or near its centre line.

During the summer the path through the strip was inspected and found to be in good order, and proper notices were posted upon the boundaries for the preservation of the natural beauties of the place, and especially for the protection of the trees and smaller growth against fire and axe; and it was much used both by members of the Club and by other lovers of the White Mountains. It is an auspicious beginning, though on a small scale, of a work which we trust will reach much larger dimensions in the near future.

During the preceding year, and at the time of this purchase, and subsequently, there were many conferences with the representatives of the Peabody Company, to obtain for the Club a conveyance of a similar strip along this path farther up the mountain. The Peabody Company recently conveyed its land to Brown's Lumber Company, and we have received an assurance from the treasurer of the latter company, that, so soon as possible, he will have an investigation made and enter into negotiations with us looking toward the proposed conveyance.

We also have been in negotiation for the conveyance of the lands including the slides upon Tripyramid Mountain, but find the titles to be in such condition that it is not prudent to go further in this matter. We have been in receipt of many inquiries and very many suggestions, but these usually have been in so general and vague terms as to preclude definite action on our part. We are willing, nay more, we are anxious, to receive suggestions for the preservation of beautiful places and of the forests, but trust that our friends will favor us so far as possible by giving to us the locations of these places and their ownership.

We have not used any portion of the money granted to us from the reserve fund by the Council of the Club, as the other subscriptions, for which we are most sincerely grateful, have been sufficient to meet the small expenses already incurred.

For the Board of Trustees.

HARVEY W. SHEPARD,
Chairman.

Reports of the Councillors for the Autumn of 1895.

Topography.

By Louis F. Cutter.

No original topographical work was done by the Department of Topography in the season just passed. The absence of the Councillor of Exploration in the Canadian Rockies prevented the proposed co-operation of the departments of Exploration and Topography in the detailed exploration and mapping of the eastern ravines of Mt. Washington; and the fact that the Councillor of Topography was obliged to remain all summer in the vicinity of Boston prevented him from doing in person any work in the White Mountains.

The time of the Councillor, however, has been pretty fully occupied with work nearer home. In April his advice was sought by the Publishing Committee in regard to the map of the vicinity of Boston which it is proposed to publish in connection with the proposed guide-book. The drawings for this map, having been prepared by the Metropolitan Park Commission solely for publication in their Annual Report, were not in all respects suitable for a guide-book, and were especially deficient in names. As a result of conferences with the Publishing Committee, the Councillor of Topography was added to the sub-committee on the map, and he was authorized to superintend the addition to the map of such names and other features as he considered necessary or advisable. In all, about four hundred names of hills, streams, ponds, villages, and streets were added to the drawings; and several other additions and numerous corrections were made. The thanks of the Department are due to Messrs. Chamberlain, Parsons, Folsom, Endicott, Hale, and others, for information as to the names of hills, streams, and streets. Information regarding the names of streets was obtained also from the atlases of Robinson and George H. Walker. It was found possible to incorporate in the new map a part of the results of Mr. E. G. Chamberlain's original survey of the Charles River. Other data, kindly furnished by Mr. Chamberlain, with reference to the boundaries of towns and cities, could not be used. The draughting of the additions and alterations was done by Messrs. G. W. Stadly & Co., the same firm that made the original drawings for the Commission. The cost to the Club of this additional work was about $125.

The drawings went into the hands of the lithographers on June 10. The first proof received from them, near the end of July, was so much out of scale, and so imperfect in workmanship, that it was rejected, and the advice of the Councillor was again sought by the Chairman of the Publishing Committee in the matter of an adjustment with the contractors, and the making of a new contract. The result of the lithographer's second attempt has now been received, and is acceptable so far as scale is concerned, but defects of workmanship still remain to be corrected.

The map when finished will be on a scale of 1:62,500, or about one mile to an inch. It will include about the same area as the map published by the Club in 1890, but will extend a little farther to the north and not quite so far to the west. Contours will be shown in brown at vertical intervals of twenty feet, water in blue, culture in black, and woods in green. The low-water line is shown as a dotted black line, and the three-fathom line as a dotted brown line. The drawings were originally prepared by Messrs. G. W. Stadly & Co., under the direction of Messrs. Olmsted, Olmsted, & Eliot, at a cost, I am informed, of between $2,000 and $3,000. The Metropolitan Park Commission granted to the Club the use of the drawings, with permission to make certain alterations and additions.

The work of Mr. Chamberlain, referred to above, in extending his survey of the Charles River from Newton Lower Falls to Clark Rock in Sherborn, — a distance of about twenty-four miles, — is the most important topographical work of a member of the Club which has come to the knowledge of the Councillor in the past year. Mr. Chamberlain located by triangulation points at intervals along the river, and filled in the detail of the intervening spaces by a traverse made on the surface of the river when it was frozen, obtaining his distances by pacing and his courses by the compass, and making the necessary adjustments for imperfect closure at check points.

Strange as it may seem, this is probably the first detailed survey ever made of that portion of the river. If other surveys have ever been made, they have not been incorporated in the published maps of the region, for the latter contain errors of detail which would not have been made by one who had carefully traced the windings of the river.

In addition to the extension of his survey up the river, Mr. Chamberlain has in part revised his map, made in 1870, of the portion of the river between Waltham and Lower Falls, and has recently printed it on a scale of 1 : 12,000. He has also done some work in making an approximate location of the town boundaries on the topographical maps of the United States Geological Survey.

Reports of the Councillors for the Autumn of 1895.

Art.

By Rose Hollingsworth.

On the advent into office of the present Councillor of Art, the chief duty ascribed to her was that of increasing as largely as possible the Club collection of photographs. She must beg, borrow, or buy — especially the first — every desirable photograph within reach.

In the matter of begging photographs she has unfortunately to confess a total lack of success. Mr. H. C. Parker, however, kindly presented us with a dozen Kodak views and three solar enlargements from negatives taken during the winter trip in February to Fryeburg, Maine, and during his ascent of Mt. Washington the previous December. Two views were also procured from the hotel album at Fryeburg.

Several purchases have been made: one, a collection of eighteen views of the Matterhorn and its immediate vicinity, taken, during an ascent, by Mr. Harry Fielding Reid of Baltimore. These are duplicates of some of those shown by Professor Niles at the meeting of the Club, January 9, 1895.

It was also thought desirable to have a part at least of Mr. George R. King's set of photographs of the Metropolitan Park System, a few of which are reproduced in the Metropolitan Park Commissioners' Report for 1895. Thirty of these views in and about Boston were purchased.

The beginning has been made also of a book of illustrations of the scenery along the route of the Selkirk party of last summer. A few pictures were bought in Boston before starting, others were picked up on the journey; and it is hoped that the set will be made comparatively complete as soon as the successful negatives made by members of the party and by Mr. Henry G. Peabody can be printed.

It was furthermore proposed that the Appalachian Mountain Club make a gift of a number of beautiful Nature photographs to some one of the Boston Public Schools. Various societies and private individuals, by gifts of photographs and pieces of sculpture, have made a brave beginning in the work of beautifying and adorning a few of our public school buildings. In the districts where the very poor live, and where the children have nothing of art or beauty in their own homes, this endeavor to brighten the school hours, at least, is especially praiseworthy. The School Committee are glad to encourage generosity in the matter, and to meet it half-way by suitably tinting the walls and ceiling of any school-room to which any one will give pictures or sculpture.

The subjects thus far presented, however, have been mostly classical or historic, and largely foreign; and it was thought that the Club by the gift of typical views of the fine scenery in our own country might help to foster a love of Nature as well as a spirit of patriotism.

The proper authorities were consulted; the Council of the Club approved, and voted an appropriation of seventy-five dollars for the purchase of six photographs, to be enlarged to 30″ × 40″ and properly framed.

The Hancock Grammar School for girls, in Parmenter Street, was selected as being most in need of beauty from outside, and letters of grateful appreciation and acceptance were received from the Committee and the Master of the School. It remained but to choose the pictures and have them enlarged, — a simple matter, it would seem. Unfortunately, however, the first prints must be as large as the 10″× 12″ size, so that amateur work was not available. Professional skill proved unsatisfactory from an artistic point of view. Half of the subjects thought of were not to be found in Boston; several prints that were satisfactory in themselves proved incapable of good enlargement. After many delays and disappointments, four pictures were made and delivered. They are Bearcamp River and Mt. Chocorua, the great Falls of the Yellowstone (the school already had Niagara Falls, presented by the graduating class of last year), a scene in the Yosemite Valley, and one among the California Big Trees. For the fifth picture Mt. Hood, Oregon, has been chosen, and is at present being enlarged by the Jackson Photographic Company of Denver, Colorado. The sixth and last picture still remains to be selected. The room chosen to receive the pictures is that occupied by the graduating class; and from a recent visit paid to the school it seemed as if the gift would be appreciated by both teachers and pupils.

The report of the Committee on the Sella Collection is appended to that of this Department.

REPORT OF THE COMMITTEE ON THE SELLA COLLECTION.

For reasons suggested in the Committee's last report, the year 1895 has witnessed no such lively demand for the loan of the Sella Collection to societies in other cities as that which characterized the first years of its ownership by the Club; on the other hand, for good and sufficient reason, the efforts of the Committee to bring the matter to the attention of bodies interested have also been less active.

At the time of that previous report the Collection was at Washington, D. C., in the hands of the United States Geological Survey for inspection with a view to the purchase of duplicates for this branch of the service. A few weeks later it was returned with grateful acknowledgments, and in even better condition than that in which it was delivered.

Since early in the spring negotiations have been pending with the Sierra Club of San Francisco for a loan of the Collection, but no definite time has yet been decided upon. The uncertainty resulting from the feeling that it might at any time be called for by our California friends, has delayed overtures to societies in certain other cities in which it seems desirable that this beautiful and instructive collection should be seen.

Meantime, however, it has been possible to accede to a proposition from the Boston Camera Club, to hold in their gallery an exhibition of a selection of views made on the basis of photographic excellence, and at the present moment more than half the Collection — covering all the available wall space — is attracting large numbers of appreciative visitors, including many of the members of our own Club. The exhibition will continue for two weeks.

It is hoped that during the coming year arrangements may be completed for exhibitions in a few of the larger western and central cities of the United States. Meanwhile the consideration that thousands are doubtless enjoying the Collection, where at most only scores could have done so had it at once been set apart for our own pleasure, will, no doubt, make it easy for our members to permit these loans for a while longer.

CHARLES E. FAY,
ROSE HOLLINGSWORTH,
FRANK W. FREEBORN,
ELIZABETH H. DENIO,
Committee on the Sella Collection.

Reports of the Councillors for the Autumn of 1895.

Exploration.

BY PARKER B. FIELD.

IN the Club circular of last June an appeal was made to the members for volunteers in the work of exploration in the White Mountains or any other region. This appeal met with three responses, and certain districts were assigned to those who offered their services; but it proved impossible for them to act upon the suggestions offered.

We have, however, made a beginning of exploration in the Rocky and Selkirk Mountains, of British Columbia, which it is felt will prove of value.

In the Rocky Mountains the first successful ascent to the summit of Mt. Hector (over 11,000 feet) has been achieved and a reconnoissance of Mt. Lefroy has been made.

In the Selkirk Mountains the range between Mt. Abbott and the Asulkan Pass was traversed, and some of its peaks ascended for the first time. The nameless summits on this range named by the party included Mt. Afton, The Rampart, The Dome, and Mts. Castor and Pollux. The trip was very largely over snow and ice, and was completed at 2 A. M.

The high ridge between the great Illicilliwaet and Asulkan glaciers was ascended twice by our parties, and was made accessible to the public by a path cut under our direction. We have given to this ridge the name Glacier Crest, as from it may be obtained a most comprehensive view of the two great glaciers near at hand, while numerous more distant ones may be seen in all directions.

Eagle Peak was also ascended by a new route. An attempt was made to ascend Rogers Peak, probably the highest of the Hermit range, which bid fair to have been successfully executed; but the party were obliged to turn back in consequence of the indisposition of one of their number.

On the homeward journey a brief visit to Lake McDonald, in Montana, showed there a large area which should be thoroughly explored; and it is the desire of the Councillor that our Club may send its pioneers into all these regions at no distant date.

The net cost of exploration for the past season has been $100.15, which amount includes an investment of $50.25 in appliances for high climbing which are now held as property of the Department.

The Councillor wishes publicly to express his appreciation of the valuable work done for the Department by Professor Charles E. Fay, to whose zeal and energy the plans for exploration in this region, and their consummation, are due, as well as of the assistance rendered by Mr. Philip S. Abbot and Mr. Charles S. Thompson, without which many of the ascents would have been rendered impossible.

Reports of the explorations recorded above are herewith appended.

MOUNT HECTOR (LAGGAN). BY PHILIP S. ABBOT.

PROFESSOR C. E. FAY, with Messrs. C. S. Thompson and Philip S. Abbot, made the first ascent of this mountain July 30, leaving Laggan July 29 with T. E. Wilson of Banff as guide, and Hiland as porter. Neither of the latter went farther than the foot of the mountain. This was reached by keeping up the railroad track for 1½ miles; then following the faint indications of an old wood-road (made for bringing out ties by the engineers who built the Canadian Pacific) for from 6 to 8 miles through charred and fallen timber, first northwest across the extensive remains of old terminal and lateral moraines, and then north up the broad glacial valley of the Bow; and then north 5 to 7 miles farther, mostly through bogs, to a point about half a mile below Lower Bow Lake. The party camped about 100 feet above the level of the valley, on its eastern side, at the edge of an opening in the woods on the lower slopes of the Hector ridge. The time from Laggan to camp, including halts, was about 11½ hours.

The mountain itself consists of, or rather is based upon, a rampart-like wall about a mile and a half in length, rising about 4,000 feet above the floor of the valley (10,000 feet or a little more above sea-level). The northern end of this rampart sinks very abruptly, so that the massif is isolated on that side. The southern end is formed by the actual peak of Mt. Hector, the southern precipices of which descend to a deep gorge which separates the massif from the much tamer and lower ridge which extends southward, and which forms the eastern boundary of the Bow valley down to the point where the latter sweeps around to the southeast immediately above Laggan. The wall above referred to consists, for the first 3,000 feet, of shale slopes, eroded into a succession of deep gullies and broad ribs or hog-backs. The upper 1,000 feet of the wall is absolutely precipitous immediately below the peak. Farther north it is interrupted by a succession of short perpendicular cliffs, representing limestone strata, which are degraded so as to be easily passable at only one point. This point is immediately above a very broad and conspicuous buttress which is separated by a great amphitheatre from a similar ridge descending from the southwest angle of the peak itself. For further details of the ascent see the article at page 1 of this number.

The time from camp to the edge of the woods was 1½ hours, from the edge of the woods to the lowest limestone stratum about 1½ hours, from the latter to the upper edge of the wall 1½ hours, thence south to the foot of the final peak, along the upper edge of the wall, a little over ⅓ mile, ½ hour, and to the summit in 2 hours more. The final peak is unapproachable on the western and southern faces, and there is, properly speaking, no southwest arête. The northern arête consists of a succession of perpendicular steps, each several hundred feet in height. The eastern arête is so deeply notched as to be passable, if at all, only by keeping to the snow on its northern slope, and it is also corniced toward the top. The only feasible approach is therefore by the steep but comparatively uncrevassed snow slopes of the northeastern face, up which there is comparatively little choice between routes. The last 100 feet consists of steep rocks which offer few good holds and require care. The summit is not snow-covered. The descent to the point where the edge of the wall was left took 1½ hours, and thence to the valley 2½ hours.

The party had no accurate means for taking altitudes; but the aneroid at the summit showed a rise of 800 feet above the point where the Canadian surveyors, on their previous unsuccessful attempt, are believed to have turned back at a measured altitude of 10,400 feet.[1] So far as the clinometer showed, the nearest peaks of equal or greater height were those about Laggan, and there appeared to be none such within measurable distance to the north, east, or west. This fact, coupled with the unusual isolation of Mt. Hector, — there being no other peak even of the second rank rising from the same massif, — makes it one of the finest view-points, if not the finest, which is accessible from the Canadian Pacific.

The approach actually taken by the climbing party is almost prohibitive on account of the fallen timber, the mosquitoes, and the swamps. A somewhat shorter and much easier and more beautiful approach would be by striking directly from the railroad track to the southern end of the ridge which bounds the Bow valley on the east, following the crest until the upper edge of the burnt timber is reached, and then keeping along the ridge just above this upper edge, thereby avoiding the steep part of the great gully south of Mt. Hector. By camping in the amphitheatre south of the buttress by which the ascent is made, and starting early the next morning, it would be not impossible to return to Laggan the same night. A comparatively small amount of cutting in the fallen timber would make the whole trail from Laggan to the camp suggested, possible for horses. A possible alternative of considerable interest is suggested by a photograph of the eastern side of the massif, kindly furnished by J. J. McArthur, Esq., of the Canadian Topographical Survey. This photograph shows that the massif is protected on the east by a perpendicular wall of rock except at one point near the northeastern corner, where the snow-field breaks over the edge of the wall and descends far down into the Pipestone valley as a fine and apparently much-broken glacier. By following the western side of the Pipestone valley to the foot of the glacier, forcing a way through the ice-fall, and reaching the final peak from the northeast, a climb of greater interest would be obtained at the cost of a slightly longer approach. The way up the final peak cannot probably be substantially varied.

CASTOR AND THE RAMPART, SELKIRKS.[2] BY PHILIP S. ABBOT.

PROFESSOR FAY and Messrs. Thompson and Abbot, on August 10, made the first ascent of Castor *via* the ridge of Mt. Abbott, the summits of Mt. Afton and the Rampart, and the upper névé of the Lily Glacier, returning by the Asulkan Glacier. The party left the Glacier House at 9.35 A. M., and reached what is commonly called the summit of Mt. Abbott at 12. Immediately beyond this, however, at the southern end of the same ridge, and separated by so gentle a depression that it is not entitled to a separate name, is a somewhat higher summit, which ought logically to be considered the real summit of Mt. Abbott. From this point the ridge turns abruptly to the west, sinks somewhat, and then rises sharply to form Mt. Afton (the "sharp nameless peak" referred to by Mr. Curtis in APPALACHIA, vol. vii. p. 296, and first climbed by Mr. Fay in 1894). The party lunched on the southern slopes below the gentle col between Abbott and Afton, and then climbed the latter peak by the steep snow and steeper but enjoyable rocks of its northeastern side. The top was reached at 1.55. It is perhaps 300 feet higher than the true summit, and 400 feet higher than the measured summit, of Mt. Abbott.

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[1] A recent determination of the Survey gives it an altitude of 11,205 feet. — ED.

[2] See also page 17 of this number.

From Mt. Afton a ridge runs for a short distance southwest, and then due south, separating the névé tributary to the Asulkan stream from the broad basin which lies east of the long ridge of Mt. Bonney. The southern termination of the ridge first mentioned is the Asulkan Pass. This ridge, when followed southward from Mt. Afton, sinks at first quite rapidly, and then rises gradually, culminating half a mile from Mt. Afton in a summit somewhat over-topping the latter. From Mt. Afton to this point, and for some distance beyond, the ridge drops off to the east in a superb and impassable[1] wall of black precipice, 500 to 1,000 feet in height, which is conspicuously seen from Glacier Crest. For this entire portion of the ridge the name of "The Rampart" is suggested. To the south of Perley Point, the crest of the Rampart sinks, and on its west side, at the same time, the névé of the Lily Glacier gradually rises, until finally a high col, snowy on its western side, is formed between the southern end of the Rampart and the next elevation on the ridge, the dark rounded peak, probably a little less than 9,000 feet high, for which the name of "The Dome" is suggested. This col can easily be reached from the west. On the east it is defended by a short rock wall, and by a succession of ice chasms and gorges which afford the wildest and most picturesque glacial scenery to be found anywhere in the neighborhood of the Glacier House. The high névé basin in which these schrunds occur is separated from the much lower and less extensive basin immediately below the Rampart by a short rock spur running eastward from the southern end of the latter. Beyond the Dome is another col, about 8,100 feet in altitude; like the former, easily reached from the level névé to the west, and descending steeply to the east. The crevasses at this point, however, though fine, are not so repellent, and there is little doubt that a way can be found through them. For this pass the name of

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[1] Except possibly at one place just before reaching Perley Point, the culmination, where the ridge bends a little to the southwest, and where a series of narrow ledges may conceivably enable the cliff to be scaled.

"Sapphire Col" is proposed, suggested by a beautiful little frozen tarn of the deepest blue nestling in the edge of the snow just below the summit of the pass.

South of Sapphire Col the ridge rises to its highest point or points, — the two snow-peaks, each about 9,100 feet in height, which form the most conspicuous object in the background just before the west-bound train reaches Glacier House, — and for which, from their singular likeness in altitude, outline, and color, the names of Castor and Pollux are proposed. To the south of Pollux the crest of the ridge sinks steadily to the Asulkan Pass.

The party left Mt. Afton at 2.15, and followed the crest of the ridge (a capital piece of arête work) to the summit of the Rampart, which they reached at 4. Thence they descended diagonally to the névé of the Lily Glacier on the west, reaching snow at 4.20. From this point, owing to the excellent condition of the snow and to its level and uncrevassed surface, they made good progress, passing around the western face of the Dome, and (4.40) over the Lily Pass, between the Dome and the southeastern spur of Mt. Bonney, for which the name of "Mt. Swanzy" is suggested. Lily Pass is an almost imperceptible water-shed separating the névé of the Lily Glacier from that of the hitherto unnamed glacier flowing south to feed Fish Creek, which may be called the "Swanzy Glacier," from the peak around whose eastern base it flows. Crossing the névé of the latter glacier, still almost on a level, they came to a point just below the Sapphire Col, above described, between the Dome and Castor. The col itself was reached at 5.35. The ascent of Castor was easily made in half an hour by zigzagging up its eastern face to a point on the northern arête just above the end of the bergschrund, and thence following the steep but firm and curiously easy rock arête to the top, which was attained at 6.05.

This is believed to be a new ascent. It would apparently have been easy to follow the ridge over the summit of Pollux to the point on its southern arête, which subsequently was actually crossed by the party in order to descend on the Asulkan Glacier; but as time did not permit, the party left Castor at 6.13, reached the Sapphire Col by the aid of a glissade at 6.35, and returned to the firm and level névé of the Swanzy Glacier by an oblique descent. They continued from this point, keeping as nearly as possible in a contour, past the western faces of both Castor and Pollux, and then turned to the left and struck the southern arête of the latter at 7.10, just above a curious cliff of bare ice, wave-like in shape, which rises out of the névé and cuts across the arête at right angles to the latter. The névé on the eastern face of the ridge, which was reached by a very short rock scramble down from the arête, is quite different from that on the other side, being very steep, undulating, and broken by great crevasses which involve considerable detours. At this point, however, it can apparently be descended with greater ease than at any other point between the northern end of the névé below the Rampart and the Asulkan Pass. The descent (by a long zigzag to the south and then down the centre of the Asulkan Glacier) to the point where the route to the Asulkan Pass leaves the dry glacier and takes to the grass-covered moraine, occupied 1¼ hours. The bed of the stream was reached a little after 9 o'clock, and the Glacier House at 2 A. M., at least an hour being lost in endeavoring to find the so-called Asulkan trail, which at present has no existence whatever two miles above the Glacier House.

It is evident from the foregoing notes that, given a sufficiently early start, this fine expedition is capable of almost infinite variation. The cols between the Rampart and the Dome and between the Dome and Castor have still to be crossed, and offer on their eastern sides by far the finest and most interesting piece of ice work in the neighborhood of the Glacier House. It is not impossible that the northern arête of the Dome may tax considerably the ingenuity even of practised climbers. An attempt to descend the Rampart on the east would certainly do so. Pollux, also, is still untouched; and there would probably be both interest and some difficulty in following the crest of the ridge from the summit of Pollux down to its termination at the Asulkan Pass.

EAGLE PEAK, SELKIRKS.[1] BY PHILIP S. ABBOT.

THE third complete ascent of this peak, probably the first by the route taken, was made on August 9, 1895, by Messrs. Field and Abbot, by the western arête. They followed the so-called Cascade Path as far as the amphitheatre between Eagle Peak and Avalanche Peak (1¼ hours), leaving it and turning to the southeast at the point where the path turns northward across the brook. By ascending diagonally, following talus slopes as far as possible, in order to avoid undergrowth, they struck the arête (¾ hour) at the upper edge of the trees, and from this point followed the arête, generally keeping a few feet below the crest on the easy rocks of the south side (the crest itself being jagged and much weatherworn), to a point about 300 feet below the summit, where a somewhat extensive snow slope runs part way around the mountain, broadening toward the south into a small shelf or plateau. From this plateau a steep couloir, narrow for its upper half, extends back to the arête, striking it perhaps 300 feet below the summit. Under proper snow conditions, the couloir, which appeared to be uncrevassed, can be followed with ease nearly to its head; or, as was actually done on this occasion, the broken rocks of the final peak just above the couloir on the southwest can be climbed. When nearly even with the top of the couloir, the party struck diagonally northward, up rocks which here were very steep but comparatively firm, and reached the arête again where it merges into the narrow and very rotten summit ridge. The actual summit was reached along the top of this ridge (¼ hour), to the east and north. The total time occupied in the ascent from the Glacier House, exclusive of the stop for lunch, was 5¾ hours. The summit was left at 5 P. M., and the Glacier House easily reached at 8 by a different route; the party glissading to the bottom of the couloir, and turning to the left to the eastern end of the snow plateau, several hundred feet above the névé basin which stretches up between Uto Peak and the short southern arête of Eagle Peak. By descending diagonally to the north (*i.e.* toward the head of the névé basin), the latter can easily be reached by glissades over steep snow slopes. The remainder of the descent was made by skirting the névé at the foot of the cliffs below the plateau, then following the northern edge of the glacier over beds of winter snow and moraines, and keeping down the right side of the valley until the beginning of the thick undergrowth just above the edge of the slope which overlooks the Illicilliwaet valley; then keeping a contour to the north to the standing timber at the edge of the side valley, and then striking down diagonally northward until the Cascade Trail was reached (⅓ hour) above the Glacier House.

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[1] The first known ascent of Eagle Peak was made in 1893, by Messrs. S. E. S. Allen and W. D. Wilcox. Mr. Allen has kindly furnished the following memorandum as to his route: "We crossed the Illicilliwaet at a point south of the Glacier House, on a log, and ascended the thick timber to the right or south of the stream flowing from the glacier at the foot of Uto Peak. On reaching the basin above we ascended upon the right side, crossing, however, when near the W. end of the ice over to the N., when we ascended to the slopes of snow, and by these bearing N. generally, to the W. arête, which we gained at a point, I believe, some 300 feet below the summit. . . . The descent followed essentially the same route as far as the basin; but, owing to the rapidly approaching night, we decided to descend to the Illicilliwaet Valley by the *bed* of the stream, instead of by the timber to the S. This was a most dangerous way, and I would not care to try it again even in daylight. . . . The time was somewhat longer than yours, being about eleven hours of travelling, though part of this was done in the dark."

The second ascent was made in 1894 by a party led by Mr. W. D. Foster. Their route is not recorded.

It is believed that the above-described routes are respectively the most interesting for the ascent and the quickest for the descent of Eagle Peak. The western arête is capital climbing throughout, and is difficult in only one place, about ¼ hour above the point where the arête is first reached. Here it is crossed by a steep face of smooth rock 40 feet high, which apparently cannot be avoided by a traverse, but must be climbed by a crack running up from the crest of the ridge. In descending, the route actually taken could have been improved in two places, — by keeping in the centre of the valley, and thus avoiding a succession of smooth and glacier-polished ledges on the north side, down which a passage was forced with some difficulty; and, on reaching the standing timber, by striking straight down along its southern ridge, instead of taking a diagonal course.

Reports of the Councillors for the Autumn of 1895.

Improvements.

BY FREDERIC ENDICOTT.

OWING to press of business, the Councillor has not been able during the summer to give so much time to the duties of his office as he had hoped.

The Club paths and the Madison Hut were in very good condition at the beginning of the present year, owing to the thorough repairs in 1894; still certain additional work has been necessary.

The paths up the Northern Peaks were cleared out and repaired about the first of July, partly by Mr. Watson, partly by V. D. Lowe; and some additional repairs were made on the Lowe path later in the season, under the superintendence of Mr. W. G. Nowell. The path to the Ice Gulch was also cleared out by Mr. Lowe. The Livermore-Waterville path has been cared for by the Waterville Athletic Association, as in previous years, and the small attendant expense has been paid by our Club. Some repairs have been made on Passaconaway Lodge, which has been used by several parties.

It seems to be the general opinion that no work should be done on the Twin Mountain path until lumber operations in that section are finished, as money so expended would be wasted.

The path to the Pond of Safety will need to be thoroughly cut out next year, and the Carter-Moriah path should also be put in first-class condition throughout its whole length.

The departments of Exploration and Improvement intended to make a joint effort in the region of Tuckerman's Ravine this year; but the scheme was broken up by the absence of the Councillor of Exploration with the Selkirk party.

The system of paths upon the Northern Peaks is now so intricate that it seems almost necessary that there should be a simple map of them, which, even if not very accurate, would give their connections and such further information as might be expedient. This subject appears to be on intermediate ground between the Departments of Improvement and Topography, so that a mention of it in this report may be pardonable.

The record roll on Mt. Baldface, which had been completely filled, was returned to the Club, July 18, by Mr. Theodore M. Osborne, and a new one was placed in the cylinder, August 17, by Mr. W. J. Knowlton, who also returned several slips containing records between these two dates. The metal cylinder is reported to be damaged, and should be replaced.

The record roll on Mt. Adams was found on the last of September to be full, and a new one was prepared to take its place; but bad weather prevented its being done this autumn. The same is true of the record on Mt. Passaconaway. Mt. Lafayette appears to have never had any record roll, but it seems that one should be placed there. A report was received by the Councillor that none could be found on Mts. Liberty or Tripyramid, but the records show that cylinders were placed on both of these. It is quite likely that they are misplaced, as the record on Mt. Madison, which in June was reported missing, was found after some search. As about forty mountain summits are provided with these cylinders, it is impossible for the Councillor to have personal knowledge of them all; and any member of the Club who finds one filled, or nearly so, should report the fact.

A new register has been placed in the Madison Hut, and the old one (1891 to 1894) will be placed in the library as a "starred volume."

The Hut has been more used this season than ever before, at one time, at least, sheltering more than twice its complement. This has produced more or less inconvenience; and in some cases a misunderstanding has arisen as to the comparative rights of early and late comers, and also of Club members and non-members.

The original purpose in establishing the Hut appears to have been to furnish a refuge to any persons who might be caught on the mountain in a storm or overtaken by night, whether members of the Appalachian Mountain Club or not. This would probably be still regarded as its primary object by most of the members of the Club, and anybody reaching it under such circumstances should have an undoubted right to share its advantages.

The Hut is so far from any other house, and is approached from so many directions, that no notice of intention to use it can be given to others who are fired with a similar zeal.

Much thought has been given to this subject, and different methods of furnishing more accommodations in an emergency been suggested, — among others an addition to the Hut upon the southwest side, — but no scheme yet mentioned is deemed satisfactory. The only present remedy for such occasional inconveniences will probably be found in cultivating a spirit of unselfishness by imagining the comforts of a lodging in the outer darkness during a heavy northeaster.

All who use the Hut should be careful to leave it in good order, with plenty of dry wood for the next comer; and they should be especially careful that no encroachment is made upon the supplies kept for emergencies. No scrub should be cut in the immediate neighborhood, which has already been disfigured in this way by thoughtless persons.

Report of the Excursion Committee for 1895.

The Excursion Committee for 1895 beg leave to report that for that year, as in previous years, the work of the Club in respect to excursions and outings shows undiminished interest on the part of the members.

As expressive of the views of the Committee on the relation of excursions to the general work of the Club, the following resolutions, proposed by Mr. Mann, were adopted at a meeting of the Committee, held March 29th, 1895, after careful discussion at two meetings: —

It is the sense of the Excursion Committee —

That the excursions should be limited in number, and should preserve a close and definite relation to the aims and purposes of the Club.

That there should be one Field Meeting, at which papers appropriate to the locality should be presented.

That there should be an excursion to include Memorial Day, a possible camping-party in July or August, and a Fall excursion.

That there should be all-day walks on February 22d, April 19th, in May, and on June 17th.

That outings be limited to Saturday.

That no other excursions, walks, or outings be held except by vote of the Excursion Committee.

The object of the resolutions was, not to reduce the number of trips by the Club below that recently taken, but to give a greater significance and regularity to the excursions year by year, and to keep them entirely under the control of the Committee as a whole.

There have been during the year seven excursions, one of which was the winter or snow-shoe excursion, and thirty-three outings. Eight more outings were planned, but were given up on account of stormy weather.

The winter excursion, planned by the Snow-shoe Section, was made to FRYEBURG, MAINE, February 16th to 23d inclusive. The party, consisting of sixty-one members and friends, under the leadership of Messrs. Rosewell B. Lawrence and Walter R. Davis, stayed at "The Oxford." Mts. Kearsarge and Willard and Moat Mountain were ascended, and trips were made to Jockey Cap and Pleasant Mountain.

Fast Day having been abolished, and the 19th of April having been made a legal holiday in 1894, the Club since then has taken, on the 19th of April, the all-day walk that theretofore had been taken on Fast Day. For 1895 the party went by train to MAGNOLIA, and the walk was thence to Sunset Hill and along shore to Manchester, under the leadership of Dr. Walter J. Otis and Mr. Charles C. Hall. The day was an exceptionally fine one, and members and friends to the number of one hundred and forty took part in the excursion.

The last Saturday in April has heretofore been devoted to the regular April walk; but as it came this year only eight days after the 19th the Committee decided to omit an all-day walk on that day.

The regular May walk was taken on the 11th of May, with Mr. Parker B. Field and Miss Ellen L. Sampson as committee, to WAYSIDE INN, Coon Ledge, and Nobscot Hill in Sudbury. Sixty members and friends took part in the excursion, and on the way from the station to the Wayside Inn visited the old Walker garrison-house. The season was well advanced, the day was very warm, and the party found wild flowers in abundance. Unfortunately, the smoke from forest fires obscured the view, so that the mountains of southern New Hampshire were not visible at all, and Mt. Wachusett was but dimly discerned.

The projected meeting of the Trustees of Public Reservations, to be held in NORTHAMPTON, MASS., on Friday evening, May 31st, led to the selection of that city as the objective point for the Memorial-Day excursion of the Club. The excursion covered the period from May 29th to June 3d, and was under the charge of Mr. John Ritchie, Jr., and comprised thirty-five members and friends.

On Thursday two trips were planned, — one by a walking-party over the Mt. Tom Range, the other by carriage-road to the northern summit of Tom. The walking-party numbered thirteen from Northampton, and was joined at the entrance of the path by two local members. Of this party twelve made the trip from end to end of the range. There seems to be a local exaggeration of the difficulty of the walk. The excessive heat of the day made the trip less agreeable than it would have been otherwise. It was for the greater part through rough and pathless woods and some scrub. The fastest walker traversed the range in about three and one-half hours; while the remainder of the party, including three ladies, required about five and one-half hours. Compared with the walk over the Blue Hill range, which the Club has taken a number of times, it may be estimated as about three-fifths as fatiguing. An exciting incident of the trip was the killing of a rattlesnake.

On Friday, May 31, twenty-seven of the party made the trip in wagons to the foot of Mt. Holyoke, thence to the summit, returning to the hotel at noon. In the afternoon a party of twenty took train for Old Deerfield, spending the afternoon in inspecting the venerable buildings and the relics preserved in the museum of the Pocomtoc Memorial Association. A pleasing incident of the afternoon was the opening of her house to the Club by Miss Baker. The house, which is the oldest one in the Connecticut valley, was purchased by Miss Baker a year or two ago, and has since been repaired strictly in accordance with the methods of a century ago. Besides the quaintness of its furnishings, it has some historic interest, having been for many years an inn.

In the evening a public meeting of the Trustees of Public Reservations was held in the City Hall of Northampton. A brief introductory speech was made by Professor Tyler, of Smith College, outlining the relations of the Club to the noble work of preservation of natural beauties.

Senator Hoar, the President of the Trustees, made a stirring address on the subject of association, emphasizing the great value of historical association to a people.

As Chairman of the Standing Committee, Mr. Charles Eliot spoke on what has been done in our country for the preservation of natural scenery; and Mr. Philip A. Chase, of Lynn, outlined the establishment of the great public reservation of his city. In conclusion, Judge Shurtleff, of Springfield, spoke of the legal aspects of the case, and showed that a step toward the preservation of woodlands may easily be made by arousing public interest to insist on carrying out existing laws.

It had been the intention of the Club to pass over the summits of Mt. Holyoke as they did those of Tom, but the meeting of the Trustees disarranged the programme somewhat. A small party from Amherst, however, under the direction of Professor S. T. Maynard, did make the trip, reporting it as perfectly practicable for some other time.

On Saturday afternoon wagons were taken, and twenty-seven members of the party went on to Amherst by the way of Hatfield and North Hadley. On Monday the party returned to Boston.

The thirtieth Field Meeting of the Club was held at the Seaside Inn, Seal Harbor, Mount Desert, Maine, July 1st to 8th inclusive. The Committee consisted of Mr. Albert S. Parsons, chairman, Mr. Parker B. Field, Mr. Joshua Kendall, Mrs. Helen M. Tower, Miss Ellen L. Sampson, and Mr. J. Allen Crosby.

Ninety-five persons left Boston by the steamer "City of Bangor," Monday, July 1st, changing at Rockland, and arriving at Seal Harbor at noon of Tuesday. Thirteen others took other routes, making the party one hundred and eight in all, — thirty-eight gentlemen and seventy ladies. Thirty of the party were not members of the Club.

Wednesday, seventy-four persons took the steamer to Bar Harbor, and climbed Green Mountain, a portion taking buckboards to the top, lunching there, and walking down the south slope to the Frenchman's Camp, where teams met those who wished to ride to the hotel, though many walked the whole distance.

Thursday, July 4th, Mr. Crosby presented each one with an American flag, with "A. M. C." printed upon it. Twenty-nine drove to Bar Harbor, via the Ocean Drive, and back by the Gorge. Fifty-eight went in boats to Sutton's Island, and were hospitably entertained by Mr. and Mrs. Joshua Kendall, of Cambridge, at their charming home. In the afternoon fifty-four went on steamer to Duck Islands, barren rocks, twelve miles out at sea, the home of innumerable sea-gulls, whose nests and young were examined with interest on landing. On this day Mr. Jones of the Club ascended Brown Mountain alone, and planted the American "A. M. C." flag on its summit.

Friday was given to Sargent Mountain, ascended from Asticou, where the party of forty were carried in buckboards, eleven more walking over the summit of Jordan Mountain and joining the main party on Sargent. The return was made by Eagle Lake, the Bubbles, boats down Jordan Pond, a walk or buckboards to the hotel. Sargent Mountain will be remembered by all of the party as the most attractive and satisfactory of all, — so easy of ascent that a lady capable of any hill-climbing could undertake it, — its views in every direction being charming.

Saturday, sixty-five were driven in buckboards around Somes Sound to Beech Hill, on the crest of which lunch was taken, and the views appreciated. The delightful drive of twenty-two miles, with varied views of the mountains and bays, was much enjoyed.

On Monday forenoon members took short walks or drives, and prepared for departure, taking the steamer "Mount Desert" at one o'clock for Rockland, where the transfer was made to the "City of Bangor," and the party arrived safely and comfortably in Boston on Tuesday morning, regretting only that the excursion had not extended over a longer time. A more perfect week for the Field Meeting could not be imagined, and it seemed the more fortunate because dropped in between two periods of fog and rain, — the ten days previous to the Club's arrival having been almost sunless, and the dreaded fog settled down over the Island a few hours after its departure and continued several days. The only trip planned which was not carried out was a moonlight sail up Somes Sound on Saturday night, which a fog prevented.

The labors of Mr. and Mrs. Clement of the Seaside Inn and the efforts of the Boston and Bangor Steamship Company to make all things satisfactory and agreeable were gratefully appreciated.

Though reported elsewhere, mention should be made of papers read, or addresses given, by President Charles W. Eliot, Mr. Joshua Kendall, Mrs. Alice Sawyer Downs, Judge Mellen Chamberlain, and Captain Julius A. Palmer at the evening meetings, which were fully attended.

Two successful HARBOR EXCURSIONS, all-day outings, were made during the summer, — the first on June 17th, under the charge of Captain Julius A. Palmer. The excursion was attended by one hundred and seventeen persons, and various points of interest in the harbor were visited. The second Harbor Excursion, under the charge of Captain Palmer and Mr. J. Allen Crosby, on August 10th, was attended by fifty-one persons. Baker's Island in Salem Harbor was visited, and the steamer coasted along the shore of Magnolia and entered Marblehead Harbor.

For the first time in the history of the Club, an excursion was made during the summer to a region quite beyond the mountain system whose name it bears. In pursuance of a plan referred to in the last annual report of this Committee as among the possibilities, arrangements were made during the spring for a trip to the SELKIRK MOUNTAINS and the CANADIAN ROCKIES of British Columbia and Alberta. The outward route was *via* Montreal and Minneapolis by the Canadian Pacific Railway, through the mountain regions just mentioned, to the Pacific coast at Vancouver, B. C. ; thence by water to Victoria, Tacoma, and Seattle. The return route was over the Great Northern Railway to Duluth, Minn., thence by the steamer " North West " of the Northern Steamship Company, over the Great Lakes to Buffalo, a day at Niagara Falls, and then by rail to Boston. The time occupied was about six weeks, from July 22 to August 31, three weeks of which were spent in the mountain region proper. The party, which numbered twenty, was under the leadership of Professor Fay, the chairman of the committee, the other members being Messrs. R. F. Curtis, P. B Field, and Mrs. J. H. Thorndike.

Many things contributed to make the excursion successful and enjoyable: good weather for nearly the whole time; constant care and courtesy on the part of the railway officials; a congenial and never a fault-finding spirit on the part of the members; a succession of scenes entirely new to most and inspiring to all, showing Nature in some of her wildest aspects, and the mountain in its most impressive form; the presence of one whose experience as an Alpine climber, aided with suitable apparatus imported by the Club, rendered it possible for many to make with safety trips upon glacier and snow-field, and for a few to do some work of credit to the Club, which is reported by the Department of Exploration; finally, and not least, the entire freedom from accident or serious misfortune of any kind.

Leaving Boston on Monday, July 22, the following day was spent in visiting points of interest in MONTREAL. Here the commodious sleeping-car "Montreal" was taken, which was allowed to remain with the party for three weeks. Passing westward by the way of Sault Sainte Marie, the company spent one day at MINNEAPOLIS, where they were most hospitably entertained by a member of the Club, Rev. H. P. Nichols, and his friends.

A ride of two days over the plains followed, and then three days (July 28–31) at BANFF, in the Canadian National Park. Here visits were made to the Hot Springs, Lake Minnewanka, Tunnel, Sulphur, and Rundle Mts., together with a trip of eight miles on a steam-launch up the Bow River. At this time a party of three made the ascent of Mt. Hector (11,000 feet), a first ascent. Then three days were passed at LAKE LOUISE, considered by many to be the most beautiful lake in America. Trips were made to Mirror Lake, Lake Agnes, the Beehive, and Goat Mountain.

Crossing the Continental Divide at the Hector Pass, three days were spent at FIELD, with trips to the Natural Bridge over the Wapta River, Emerald Lake, and the ascent of Mt. Stephen (10,600 feet), including a visit to interesting fossil-beds and a camping out over night by some of the party.

Crossing the Columbia River at Donald and over Rogers' Pass, a stay of eight days was then made at the GLACIER HOUSE, in the heart of the Selkirk Mountains. The scenery here is of a distinctly alpine character, and afforded the greatest enjoyment to all. Visits were made to Cascade Summit, Glacier Crest (so named by the party), Mt. Abbott, the Illicilliwaet Glacier, the Asulkan trail, "the loop" on the C. P. R., and ascents were made by the high climbers, of Eagle Peak, Castor (a first ascent), and a partial one of Rogers' Peak. Numerous interesting walks were also taken in the vicinity, the roofs of the railroad snow-sheds affording good walking and excellent views. The stay at the Glacier House was made most comfortable by the proprietor, Mr. Ira Perley.

A ride of twenty-four hours on the C. P. R., including the Albert and the Frazer Cañons, brought the party to VANCOUVER, and thence to VICTORIA, in which cities a day or two passed pleasantly. Then a sail of one day was made to TACOMA, where Sunday was passed, and the two following days at SEATTLE. The usual summer smoke from forest fires, and some fog, prevented any views in this region, to the great disappointment of all.

The return trip was made in a special sleeping-car "Northcote" of the Great Northern Railway, leaving Seattle August 20. Through the kindness of the officials the party's car, with a special dining-car, was side-tracked at the western base of the Cascade Mountains, and sent over the mountains with a freight train by daylight, instead of at night on the regular train. The crossing of the Cascade Mountains by the famous

"Switchback," was a most interesting feature; and courteous officials, sent for the special purpose, helped to explain the points of interest as far east as the Rocky Mountains. One day was spent at LAKE MACDONALD, a fine sheet of water near the great Divide, and near a region which is probably as alpine in character as any in the United States, of which it is expected that more will be heard soon.

The homeward journey was varied by three days spent in the steamer "North West" on Lakes Superior, Huron, and Erie. The steamer is most comfortable, and the passage through the rivers from one lake to another most enjoyable. Flying visits were made by electric car or carriage to the "sights" of Duluth, Detroit, and Buffalo, and a delightful day and a half was passed in Niagara Falls and neighborhood.

The party arrived in Boston exactly on schedule time on Saturday, August 31, and in excellent condition.

The Autumn Excursion to LAKE MINNEWASKA, NEW YORK, October 3d to 12th inclusive, was conducted by Messrs. Charles C. Hall and George D. Newcomb. Forty members and friends started from Boston, and were joined at various points by others, making the whole number that took part in the excursion fifty-three.

On the first day after arrival at the hotel ten members drove to Lake Mohonk, while thirty took the walk to the cliffs of MILLBROOK MOUNTAIN. These cliffs descend perpendicularly five hundred feet. From their summit one looks down on the farms of the Walkill Valley, and across the valley to the mountains of Vermont, Massachusetts, and Connecticut. The day was warm and fine, and seven hours elapsed before the party got back to the hotel.

The next day was Sunday. In the afternoon a short walk was taken to Prospect Rock and Awosting Fall, returning by the Sunset Path.

On Monday thirty-five drove and two walked to LAKE MOHONK, where four hours were passed. Some of the party ascended Skytop. Dinner was taken at the Mohonk House, and on the return the carriages were driven to the summit of Eagle Cliff, where a fine view was obtained of Lake Mohonk below, and of the bold ridges which extend across country in the direction of Minnewaska.

On the fourth day, Tuesday, it rained during the forenoon, which was spent in the hotel and bowling-alleys. In the afternoon it cleared, and thirty-one joined in the walk to Beacon Hill, Pulpit Rock, Peterskill Falls, up the bed of the brook to Awosting Fall, and "home" by Hemlock Path.

Wednesday was again fine, and thirty-three visited the deep ravine known as the "PALMAGHAT," which they passed down through under the shadow of its grand old hemlocks, climbing the steep cliffs at the end of the ravine, and returning by the High Path. A few of the party, however, kept on as far as the prominent point called "Gertrude's Nose," and returned later by the Millbrook Path.

Thursday opened clear and cold, but grew warmer as the day advanced. The principal walk this day was to HIGH POINT, three and one-half miles distant, and elevated two thousand two hundred feet above sea-level. High Point commands an extensive and beautiful view of the Awosting Basin, in which lies Awosting Lake, — its blue water on that day sparkling in the sunshine, — and of the southern part of Shawangunk Mountain range as far as Sam's Point. A discovery was here made of a profile high up on one of the cliffs, and extremely well defined. So far as could be ascertained, this profile had never before been observed, and it was proposed to name it "The Appalachian Face."

Next day (Friday) was very fine. In the forenoon a large party went chestnutting down in "Mossy Glen," while twelve visited the "Great Crevices," where they descended one hundred feet, by ladders, at the southern end of the crevices, passed through their entire length, and emerged at the northern end, returning to the house by the beautiful Crevice Ledge Path and Beacon Hill. In the afternoon of this day, a party of twelve visited the wild and interesting "Amphitheatre."

On Saturday morning, October 12th, the party left the hotel, and at Loyd the train was taken for Hartford and Boston, where it arrived at 9.15 P. M.

It may be of interest to add that a boat-race, a base-ball game, and a cake-walk were given by the athletic members of the party, and were very successful. Also, that the excursionists did not lack for evening entertainment of a high order of excellence, particularly an interesting talk by our host, Mr. Smiley, upon the discovery of Minnewaska and its development as a summer resort, together with a humorous account of its recent invasion by a tribe known as "The Appalachians."

An all-day outing was taken Saturday, October 19th, under the charge of Mr. F. V. Wright and Mr. James R. Carret, by a party of twenty-nine, to HAMILTON and WENHAM, visiting the ruins of the Willowdale Mills.

The all-day outings, four in number, some of which have been already mentioned, are as follows: February 22d, Lynn (taken on snowshoes); June 17th, Harbor Excursion; August 10th, Harbor Excursion; October 19th, Hamilton and Wenham.

The number of members and friends on the thirty-three regular outings was one thousand and sixty, and on seven excursions four hundred and seventy-seven, making a total of one thousand five hundred and thirty-seven. The average number of persons on the outings was thirty-two, and on the excursions sixty-eight. The 19th of April walk, and the May walk, though from custom counted as excursions, are in fact all-day outings, and if so counted, would make the average number of persons on the outings thirty-six, and on the excursions fifty-five.

Thirty-three members of the Club have served as leaders or on committees in charge of outings and excursions, — outings planned and advertised, but given up on account of stormy weather, being counted as well as those planned and taken. Of these thirty-three, one has served on seven occasions, one on six, three on four, four on three, four on two, and twenty on one.

The financial report of the Treasurer of the Committee shows a balance in cash of $65.86. There are also assets on hand in the shape of railroad tickets on the various roads out of Boston to the value of $87.72.

Rest F. Curtis, George H. Barton, James R. Carret, Parker B. Field, Charles C. Hall, George C. Mann, Wm. H. Sylvester,	*Committee on Field Meeting and Excursions.*

Proceedings of the Club.

May 8, 1895. — One Hundred and Fifty-sixth Corporate Meeting.

Vice-President Parsons in the chair.

Sixty persons were present. Five candidates for Corporate membership were elected.

The Vice-President called attention to the season's excursions.

A paper describing an ascent of Niohosan in Japan, prepared by Miss Lucy A. Putnam, was read by Miss M. A. J. Frothingham. The mountain is an extinct volcano near Nikko, and about 8,000 feet high. The beautiful and extensive views were described, and interesting characteristics of the people mentioned.

Mr. Parker B. Field described the Club Camp at North Sandwich, N. H., last August, and illustrated with many lantern views of the region and particularly of Chocorua.

Professor C. E. Fay spoke concerning the proposed trip to the Selkirks, and showed some lantern views, including a few highly interesting telescopic views.

June 12, 1895. — One Hundred and Fifty-seventh Corporate Meeting.

Vice-President Parsons in the chair.

The business meeting of the Club was held in the ante-rooms of the Cyclorama Building, 541 Tremont Street. About one hundred and twenty-five persons were present. Nine candidates for Corporate membership were elected.

After the business had been transacted, those present adjourned to the interior of the building. It was a warm day without; but within the volcano of Kilauea the heat was appropriately suggestive of internal fires.

Professor George H. Barton, who has studied Kilauea in eruption, addressed the meeting. He spoke of the geology of the Hawaiian volcanoes and especially of the crater of Kilauea, and called attention to many details, correctly and graphically represented to the audience. The cliffs and fissures, the lakes and fountains of fire, the lava tubes and other features were described, and emphasis was laid upon the wonderful changes constantly taking place.

July 2 to 8, 1895. — Thirtieth Field Meeting, held at Seaside Inn, Seal Harbor, Mount Desert, Maine.

Vice-President Parsons presided at all the meetings.

One hundred and nine members and friends were present.

Tuesday evening, July 2, Mr. Parsons, as leader of the excursion, announced the programme for the week as follows, —

Wednesday. To Green Mountain, via steamer to Bar Harbor.

Thursday. To Sutton's Island as guests of Mr. and Mrs. Joshua Kendall; in the afternoon by steamer to Duck Islands.

Friday. Sargent Mountain.

Saturday. By buckboards to Beech Hill; in the evening moonlight excursion by steamer up Somes Sound.

Mr. Parker B. Field, who had arranged the walks and rides so admirably, added many details and alternative shorter trips for such as preferred them, describing his own explorations in the fog before the arrival of the party.

On Wednesday evening, July 3, President Charles W. Eliot, of Harvard University, addressed the Club, giving a delightful itinerary of a possible steamboat excursion along the Maine coast, from Casco Bay to Frenchman's Bay, visiting, in the various bays and rivers which make the region so picturesque and varied, all the points of interest or of beauty. Incidentally much of the history, geography, and geology of the Maine coast was given, and interesting and amusing incidents connected with the nomenclature of the islands, originally named by the French but "adapted" by the later English settlers with curious variations. His earnest plea for Mount Des'ert, rather than Mount Desert', quite converted the Club to the less popular pronunciation.

On Thursday evening, July 4, Captain Julius A. Palmer, of the Club, gave a short but interesting and instructive talk on the Hawaiian Islands, from which he had just returned, touching upon their history, geography, attractions, and political past and present. Patriotic songs were sung by the Club.

On Friday, July 5, Mr. Joshua Kendall, of Cambridge, read a paper on Thoreau, which was much enjoyed. Its estimate of Thoreau's place in literature and in life called out some lively discussion.

On Saturday, July 6, Mrs. Annie Sawyer Downs, of Andover (but long a resident of South West Harbor in summer, being a descendant of the Sawyers of the Island), gave a paper on the Beauties and the Flora of Mount Desert, which was as charming a description of the varied attractions of the Island as the Club's explorations had been a realization of them. The peculiarities of the flora of the island, differing so much even from the mainland around it, were interestingly described. Judge Mellen Chamberlain followed in an address on the spiritual and inner influences of the enjoyment of Nature, and the duty of cultivating the love of natural scenery, both for its own sake and for its elevating and ennobling effects upon the soul.

The meetings were all largely attended, and apparently much enjoyed.

October 9, 1895. — One Hundred and Fifty-eighth Corporate Meeting.

Vice-President Parsons in the chair.

Eighty persons were present. Nineteen candidates for Corporate membership were elected.

The Recording Secretary read a letter from Mr. C. C. Hall stating that the Appalachian Club party, then at Lake Minnewaska, N. Y., were enjoying themselves very much.

Under the vote of the Club passed at the Annual Meeting in January, the presiding officer appointed the following committee to nominate officers for the ensuing year: Mr. Charles C. Hall, chairman, Mr. J. R. Edmands, Miss J. C. Clarke, Dr. Thomas Crozier, Captain Julius A. Palmer.

The chairman appealed to the members for photographs to illustrate the Guide Book "Around about Boston."

Mr. Amadeus W. Grabau addressed the Club concerning "The Physical Geography and Scenery of Nova Scotia." The subject was introduced with a brief account of the geology of the peninsula, and then the physiological features were explained in light of the geology. The action of glaciers and rivers in forming the valleys and cuts at a period when the land was much higher was referred to, as well as the subsequent drowning, on the subsidence of the land, resulting in the deep fjords and bays. The Bay of Fundy was thus accounted for. Maps and diagrams were used in illustration, together with forty lantern views. Deep caves caused by the action of waves and tides, striking columnar formations in the basaltic cliffs, and many picturesque bits of scenery were shown upon the screen.

November 13, 1895. — One Hundred and Fifty-ninth Corporate Meeting.

Vice-President Parsons in the chair.

One hundred and fifteen persons were present. Nine candidates for Corporate membership were elected.

Attention was called to the meeting to be held November 20, and another appeal was made for photographs to illustrate the Guide "Around about Boston."

The Councillors of Topography, Art, Exploration, and Improvements presented their annual reports. See pages 90–105.

Mr. Russell W. Porter then gave an account of his trip to Greenland with the Cook Expedition in 1894. A description was given of the ill-fated iron steamship Miranda, and of the accidents and privations of the trip. Illustrations were thrown upon the screen, showing ice floes, icebergs, glaciers and mountains, also of the Esquimaux and their boats. An account of the trip has just been published, and Mr. Porter bespoke a large sale, since the proceeds would go toward the compensation of the Gloucester fishermen who rescued the party.

November 20, 1895. — Special Meeting.

Vice-President Parsons in the chair.

About one hundred persons were present.

The Club was addressed by Mr. T. W. Harris, of Keene, N. H., his subject being, "The Why and Wherefore of Mount Desert Island." The speaker gave a remarkably clear exposition of the geological history of the island through the ages, and accounted for many unusual and interesting features. He spoke of the formation of the sandstones and slates, the volcanic outbreak which produced the granite, the wear of the ages which stripped off the upper layers, the glacial epoch which resulted in the rounding of the mountains, the transporting of boulders and the gouging out of the valleys, and finally of the comparatively modern period during which the island has been gradually rising. The subject was illustrated with blackboard maps and sketches.

Many photographs were exhibited by members who attended the Field Meeting at Seal Harbor in July.

December 13, 1895. — One Hundred and Sixtieth Corporate Meeting.

President Hale in the chair.

One hundred and fifty persons were present. One candidate for Corporate membership was elected.

Several short papers describing the excursion of last summer to the Canadian Rockies and Selkirks were presented by members of the party.

Miss E. F. Blacker described the outward journey from Boston to Vancouver. She gave a narrative account of the journey, with many interesting botanical observations.

Mr. Harvey N. Shepard read a paper entitled "Alice in Wonderland," being extracts from his daughter's letters, and giving the impressions of a girl of thirteen years.

Mrs. Parker B. Field read an account of the stop at Lake Louise, and of the climbing done by the members of the party in that grand and beautiful region.

Professor C. E. Fay described the reconnoissance of Mt. Lefroy, and showed what seemed to him the only possible route to the summit.

Mr. R. F. Curtis gave an account of the Club trip upon Glacier Crest, between the Illicilliwaet and Asulkan Glaciers, and of the return of four ladies and four gentlemen by the former glacier.

These papers were illustrated by a large number of lantern views from negatives by Mr. Parker B. Field, who added words of explanation, and also by twenty-three mounted photographs, the work of Mr. Henry G. Peabody.

December 27, 1895. — Special Meeting.

Vice-President Parsons in the chair.

One hundred and sixty persons were present.

This meeting, like the preceding one, was devoted to papers descriptive of trips in connection with the Club excursion to the Rockies and Selkirks last summer. Many lantern views were shown.

Mr. Philip S. Abbot presented a paper entitled "The First Ascent of Mount Hector" (see p. 1).

A paper on "Mount Castor and the Asulkan Ridge," by Mr. Charles S. Thompson, was read by Mr. Parker B. Field (see p. 17).

Professor C. E. Fay gave an account of the ascent of Mt. Stephen, concluding with an appropriate tribute to our esteemed member, Mr. William H. Ladd, whose decease occurred soon after his return from the Western trip (see p. 26).

The Chairman appointed as a Committee to audit the accounts of the Treasurer and Trustees, Messrs. George O. Davis, George O. Smith, and Rufus A. Bullock; and as Committee to arrange for the Annual Reception, Messrs. John Ritchie, Jr., Oliver L. Briggs, Wm. S. Rumrill, Miss M. A. Knowles, and Miss Katherine H. Andrews.

January 8, 1896. — One Hundred and Sixty-first Corporate (Annual) Meeting.

Vice-President Parsons in the chair.

Seventy persons were present. Three candidates for Corporate Membership were elected.

The chairman called attention to the exhibition in the rooms of the Boston Camera Club of the Sella Collection of Photographs, loaned by the Appalachian Mountain Club.

The annual reports of the Recording and Corresponding Secretaries, Treasurer, Trustees of the Permanent and Reserve Funds, Trustees of Real Estates, and Auditors, were presented and accepted. For the several reports see pages 70–90.

The report of the Excursion Committee was presented by Mr. James R. Carret (see p. 105).

The Committee on the Nomination of Officers for 1896 made the following report: —

For President, Albert S. Parsons; for Vice-President, Charles B. Cumings; for Recording Secretary, Rosewell B. Lawrence; for Corresponding Secretary, John Ritchie, Jr.; for Treasurer, John E. Alden; for Councillor of Natural History, Mrs. Helen M. Tower; for Councillor of Topography, Louis F. Cutter; for Councillor of Art, Rose Hollingsworth; for Councillor of Exploration, Parker B. Field; for Councillor of Improvements, Frederic Endicott; for Trustee of the Permanent and Reserve Funds (for three years), Charles H. French; for Trustee of Real Estate (for four years), Augustus E. Scott.

The balloting for officers resulted in the unanimous election of all the candidates nominated. The presiding officer then appointed the Vice-President a Committee of one to escort the President elect to the chair. After applause, President Parsons accepted the office with remarks which showed the high esteem in which he held the Club.

The following papers were presented: "Mount Goddard and its Vicinity, in the High Sierras," by Theodore S. Solomons, of San Francisco (see p. 41); "Avalanche Basin, Montana Rockies," by Dr. Lyman B. Sperry, of Bellevue, Ohio (see p. 57).

The latter paper was read by title; a portion of the former was read by Professor C. E. Fay, who also described the lantern views which illustrated both.

The following amendment to the By-Laws was offered by Mr. Harvey N. Shepard and seconded by Capt. Julius A. Palmer: —

To amend Article XII. by omitting the words "the afternoon of," so that it shall read "The January meeting shall be the Annual Meeting, and shall be held on the second Wednesday of that month."

January 13, 1896. — Special Meeting.

Vice-President Cumings in the chair.

One hundred and twenty persons were present.

Mr. L. S. Griswold presented a paper entitled "Yosemite to Mono Lake and Return." His route was by way of the Yosemite Falls trail, the Tuolumne Meadows, Bloody Cañon, and Mono Pass to the Lake; he returned by Lundi Cañon, the Merced River, and Nevada Falls. Fine lantern views were shown of the Yosemite Valley and of points on the route.

A paper by Mr. Theodore S. Solomons of the Sierra Club, San Francisco entitled "The Grand Cañon of the Tuolumne," was read by the author's brother, who had also visited the region. A large number of lantern views illustrated the wonderful scenery of the cañon and the high peaks and domes along and near the divide.

This paper will probably be printed in APPALACHIA VIII. No. II.

Officers for 1896.

President.

ALBERT S. PARSONS, Lexington.

Vice-President.

CHARLES B. CUMINGS, 89 State Street, Boston.

Recording Secretary.

ROSEWELL B. LAWRENCE, 53 State Street, Room 518, Boston.

Corresponding Secretary.

JOHN RITCHIE, JR., Box 2725, Boston.

Treasurer.

JOHN E. ALDEN, 60 Devonshire Street, Boston.

Councillors.

Natural History, Mrs. HELEN M. TOWER, 7 Ellsworth Ave., Cambridge.
Topography, LOUIS F. CUTTER, Winchester.
Art, ROSE HOLLINGSWORTH, 112 Mt. Vernon Street, Boston.
Exploration, PARKER B. FIELD, Milton.
Improvements, FREDERIC ENDICOTT, Canton.

Trustees of the Permanent and Reserve Funds.

REST F. CURTIS. I. Y. CHUBBUCK.
CHARLES H. FRENCH.

Trustees of Real Estate.

HARVEY N. SHEPARD. CHARLES E. FAY.
J. RAYNER EDMANDS. AUGUSTUS E. SCOTT.
PARKER B. FIELD, *Ex officio.*

Members added since March, 1895.

Arnold, Chester H., West Roxbury.
Baldwin, Mrs. Judson, Roxbury.
Breed, Preston H., Lynn.
Burrell, Mrs. E. M. A., Boston.
Chandler, Miss Ella J.,[1] Cambridgeport.
Cleaves, Miss Florence, Roxbury.
Codman, Russell S., Boston.
Coggeshall, Miss Annie N., Providence, R. I.
Cram, Gardner,[1] Brunswick, Me.
Crosby, Mrs. Helen A., Newton.
Currier, Miss Lillian G., Jamaica Plain.
Curtis, Thomas R., Boston.
Demarest, David, Lynn.
Dyer, Walter A., Dorchester.
Glessner, George McB., Chicago, Ill.
Gunn, Miss Kate S., Dorchester.
Hammond, Miss C. F., Boston.
Henry, William L., Charlestown.
Hitchings, Eben W., Boston.
Hodges, George W., Hyde Park.
Horton, Herbert A., Brookline.
Howe, Edward W., Roxbury.
Hutchinson, Miss Alice, Dorchester.
Ingraham, Arthur, New Bedford.
Jones, Everett Starr, Spencer.
Jones, Miss Helen L., Roxbury.
Laws, Frank A., Boston.
Lawton, Charles O., Boston.
Lawton, Mrs. Chas. O., Boston.
Littlefield, Miss Carrie J., Roxbury.
Munro, Miss M. H., Boston.
Oliver, Miss S. E. C., Salem.
Paine, William A., Boston.
Patterson, Miss Alice M., Salem.
Penhallow, Thomas W., Boston.
Phipps, C. Frank, Dorchester.
Pope, Edward W., Newton.
Prescott, Miss Henrietta J., Cambridge.
Reed, Miss Bessie C., Dorchester.
Seavey, Mrs. M. L., Boston.
Shillaber, Charles P., Boston.
Smith, Miss Lucy S., Easthampton.
Solomons, Theodore S., San Francisco, Cal.
Stone, Charles A., Boston.
Strahorn, Robert E., Boston.
Strahorn, Mrs. R. E., Boston.
Thompson, Charles S., Chicago, Ill.
Wetherbee, Charles G., Newtonville.
Wiley, Mrs. Emma S., Boston.
Wolcott, Miss Caroline A., Cambridge.
Wolcott, Miss Elizabeth B., Cambridge.
Wright, Charles H., Boston.

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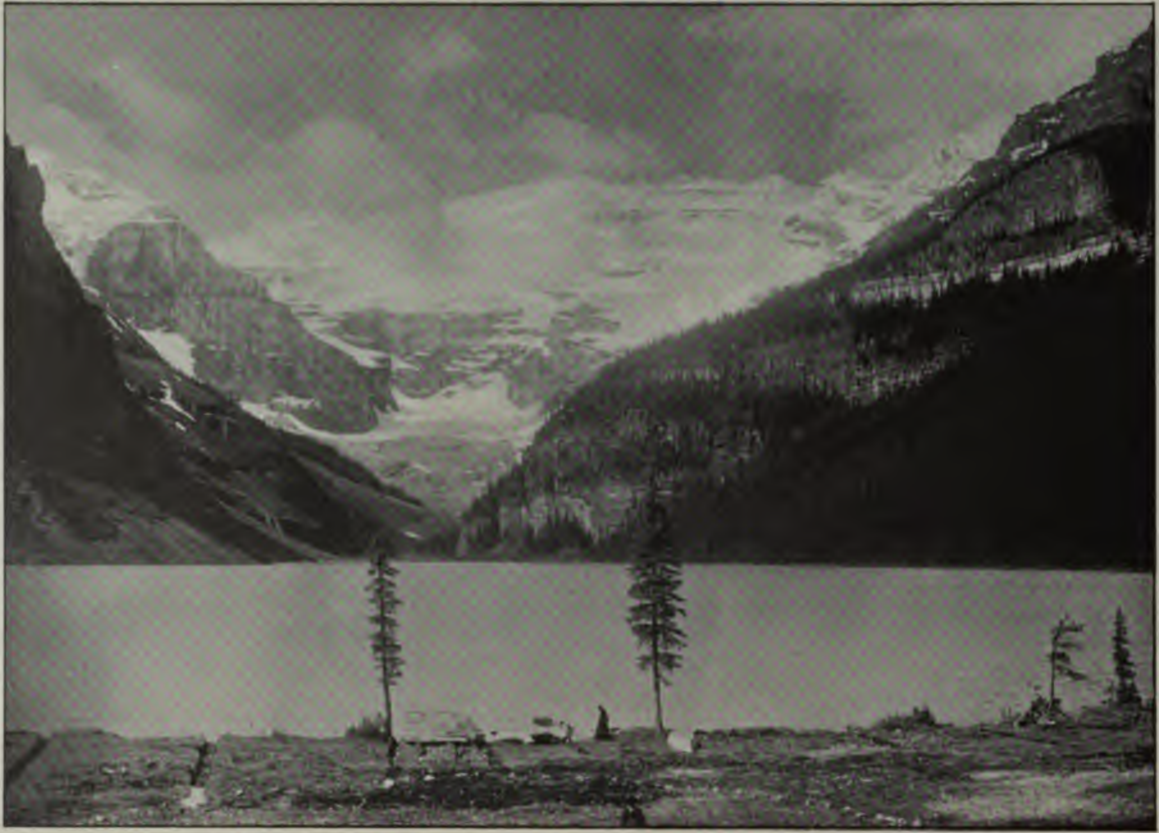
[1] Life Member.



LAKE LOUISE.

From a photograph by H. G. Peabody, Boston.

APPALACHIA.

Vol. VIII. BOSTON, NOVEMBER, 1896. No. 2.

In the Couloir on Mount Lefroy.[1]

By Charles S. Thompson.

Read June 9, 1896.

Among the memories of our last summer's outing there lies the image of a high, bell-shaped peak thrust mightily forward between the Green and Mitre glaciers of Lake Louise, — the famous, much-disputed Mt. Lefroy. Gazing upon it with avaricious eyes from the summit of Goat Mountain, our greedy hearts were filled with a desire for its topmost bit of crystal, rock or ice; that desire is still with us.

This is what we saw from Goat Mountain. At our feet, half a mile below, the valley of Lake Louise rose slowly southward, through lake and rock-fall, through terminal moraine and almost level glacier, to the massive wall of Mt. Green, where the Continental Divide, hitherto the western limit of the valley, swept suddenly eastward, and for an instant looped hesitatingly toward the north. In this angle of hesitation, ere the great divide definitely turned to the southeast, — forming in fact the eastern head-wall of the valley, — stood Mt. Lefroy. Beyond the shoulder of Hazel Peak its eastern face looked full upon us, a thousand feet of snow slope and hanging glacier, three thousand feet of gray quartzite sheer to the Mitre Pass, — the cross section of a mountain. Up that surface surely there was "no thoroughfare." The northern face, seen almost in profile, a mingled slope of snow and rock terminating below in relatively insignificant cliffs, offered certain possibilities. Above the cliffs we traced a route to the summit, certainly no Sabbath-day journey, demanding the full limit of our experience, yet glorified by the prospect of success. But could we pass the barrier of the cliffs? A seeming snow-drift at the base, a re-entrant angle in their outline above, suggested a hidden couloir, a possible passage. A reconnoissance only could solve our doubts.

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[1] Mr. P. S. Abbot discussed this article with me one day last May, on which occasion it was mutually agreed that each should annotate for the other all future contributions to Appalachia.

Thus it happened that at three o'clock on the afternoon of Friday, August 2, 1895, Professor Fay, Mr. Abbot, and the writer rowed leisurely southward to the head of Lake Louise. Landing, we crossed, ankle deep, with rising temper but with falling temperature, a wretched stretch of alluvial bottom, crawled over and around rock falls that partially choked the valley, and passed upon the Green Glacier at a point on its western side not far from its lower end. Not, however, until we stood in the frozen amphitheatre at the head of the glacier did the measure of our opportunity open upon us.

On Lefroy's western face the relatively insignificant cliffs had now grown to vertical walls, many hundred feet high, broken in but one place, and even there by no means seriously. Up the re-entrant angle of that fracture ran a long, narrowing ribbon of snow that failed about one hundred feet below the top. Above came a bit of ledge, then the white dot of an isolated snow patch, and the long suggestion of a dubious rock chimney. The couloir was flanked on the left by an impassable wall; on the right by a narrow buttress, whose top formed with the cliffs immediately above and below an exceedingly rough and steeply pitched two-stepped terrace. At the head of the buttress, on the side farther from the snow slope, there was a deep rift somewhat less promising than the dubious rock chimney at the head of the couloir. The final ascent to the head of the cliffs was inevitably by one or the other of these routes. Clearly the measure of our opportunity was not pressed down and running over.

The uncertainty fired our desire. Up to that moment — I write advisedly — we had had no notion of proceeding farther. The amphitheatre had been tacitly set as the limit of our day's reconnoissance. Thereafter, for good or evil, regardless of time or supper, we set ourselves to test the availability of that couloir before returning to the chalet. There was no hesitation; it was an instantaneous determination.

The hour-hand of our watches was well after six before we were roped and ready for the assault. The first obstacle, a schrund that well-nigh separated the ice slope from the glacier, was easily overcome by a snow bridge near the foot of the buttress. As our course thereafter held directly above it, that schrund made a diverting feature of the landscape for the remainder of our climb. Whether it could be crossed by a party of three in involuntary glissade is still an unsolved problem of experimental physics, although at the time one much discussed. Our further course was a varying diagonal, first to one wall of the gully, then to the other; and as the couloir was narrow, the change in direction came with annoying frequency. To our added disgust, the slope rapidly became steeper, — indeed, as steep as snow ever lies even in a couloir. The constant necessity of shifting the rope to my lower side at each turn enabled me, as middle man, peculiarly to appreciate the beauty of this increasing angle. By the time we overlooked the top of the lower buttress I had become extremely proficient in a new *pas seul*, the rope-dance, — a step highly exhilarating, but under the given circumstances somewhat nerve-trying. However, the snow was firm, and Abbot's "coal-scuttle steps" made excellent footing.

About fifty feet above the junction of the buttress with the main wall the snow in our couloir ended in a narrow tongue that apparently lapped upon the ledge above. Below, the angle of slope rose most perceptibly to fifty degrees; on the tongue itself it was over sixty-five. Abbot crept softly upwards, pivoted a moment on the lip, and then with unexpected caution drew himself upon the ledge. It was now my turn. As I stood at the foot of the tongue, his voice came to me blandly and with the utmost suavity urging care. A peculiarly sweet and caressing note in Abbot's voice usually forebodes ill. In this instance my assumption was correct, my deduction wrong. I fancied the unwonted slope the coming difficulty, and with mighty kick drove my foot well into the root of the tongue. Never was step firmer, never more unsatisfactory. The shank of my shoe rested in the step as on the round of an oaken ladder; the sole and toe explored hidden depths beyond. A frail three-inch shell supported that inevitable tongue. Scarcely visible scratches marked my succeeding steps; by the fourth, I knelt upon the lip with eyes thoughtfully fixed upon a gap of some unknown depth separating snow from perpendicular rock. Abbot's strong assistance, with some doubtful exertions in my own behalf, brought me safely to his anchorage. Physical weight having tested, mental culture, less heavily incarnate, followed easily. With beatified countenance Professor Fay joined his companions on the ledge.

Here we left our axes, — a decision hastily regretted as we crawled over the forgotten fifteen-foot dot of snow. The wave of our enthusiasm was indeed well-nigh spent. Already the great shadow of the mountains beyond the Green Glacier had crept far above us, and darkness doubtless lay between us and the chalet. Slowly, with some fear of rolling stones, we worked our way up the chimney to a point where it turns slightly to the right. Up that turn a passage could probably have been forced, but at a far too extravagant outlay of our few remaining daylight minutes.[1]

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[1] The point where we stopped is probably the key to the mountain. I was a little in advance of the others; and from where I stood, it was not only possible to see the end of the chimney, but the size of the patch of sky which marked the end gave encouragement as to the probable steepness of the final climb. Immediately above us, however, was rather a *mauvais pas:* for foothold, a narrow ledge, sloping slightly outward; about ten feet of perpendicular rock; a narrow crack running up the face, which offered no perfect hand-holds; and a large stone insecurely wedged near the top, quite ready, as it seemed, to be pulled down upon us. We might have had to combine our forces to get up. If we had been thirty minutes earlier, I think we should have done it, ascended the chimney to the top, and virtually proved that the mountain can be climbed. At that hour, however, the game was distinctly not worth the candle. We had, at any rate, the satisfaction of knowing that we had come nearer than any of our

So we turned; none too soon, for it was dusk when we reached the lake, and ten o'clock ere we were sitting in the doubly comfortable chairs of the chalet dining-room. There we gorged on cold beef and pie, washed down with draughts of cold milk, and our host Astley told us the story of the Wilcox party and their misadventure in that same couloir.

Had we definitely decided our morrow's plan at the table that evening, the result of our next day's climb might have been different. We chose, however, to sleep upon the matter, and as a natural result barely missed being carried with the rest of the party to Field. At the eleventh hour, more literally at eight the next morning, Professor Fay looked upon me, I looked upon Professor Fay, Abbot beamed benignly upon both, and — our fellow travellers went over the divide without us.

But the three sisters of a primitive linen industry spun for us that day no kindly thread. On overhauling our rücksack preparatory to crossing the Green Glacier, we found one pair of smoked goggles lacking, and, late as we already were, we must needs char wood and bedaub our faces withal in a manner befitting certain savage saltatorial rites. Such saltatorial rites we were indeed shortly called upon to observe. A glacier is like a woman, charming or the reverse, in its rapidly changing moods. That day the snow bridges were soft, the crevasses labyrinthine. 'T was a game of hop skip and jump, vastly repeated, bringing us by the traditional route of Robin Hood's barn to the foot of our couloir, well beloved. A warm night, a warmer morning, and a gently drizzling rain had turned the snow into greasy granules, that slipped under our shoes in a manner most miserable and abominable. Hesitating below the enfeebled tongue, we ultimately decided to pass it by on the other side. He whose position in the party would have brought him first upon it delivered this opinion with an unction gratifying to witness.[1]

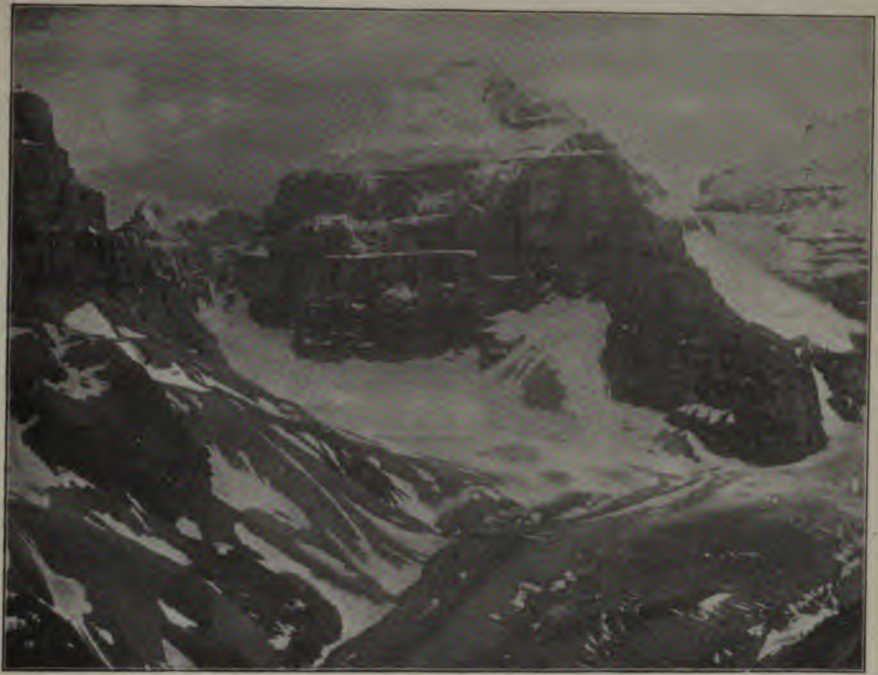
predecessors to solving the problem of Mt. Lefroy; for Mr. Wilcox's party were forced to stop before reaching the chimney at all, one of the party being struck and injured by a rolling stone. — P. S. A.

[1] It is doubtful whether it will ever be possible to get upon the rocks from the snow at the head of the couloir without the aid of the tongue, and very

"The other side" meant an attempt by way of the second chimney. To reach its foot, we wriggled along the top of the buttress in a serpentine fashion truly delightful. The primeval curse became under such circumstances an unquestioned blessing. Yet even in this humble posture the stones rattled ominously, and our advance was, truth to tell, exceedingly labored. Methought, indeed, I heard an ejaculation of unfeigned contentment from either end of the rope as we forced our way past a snow heap into the cavernous depths of the chimney.

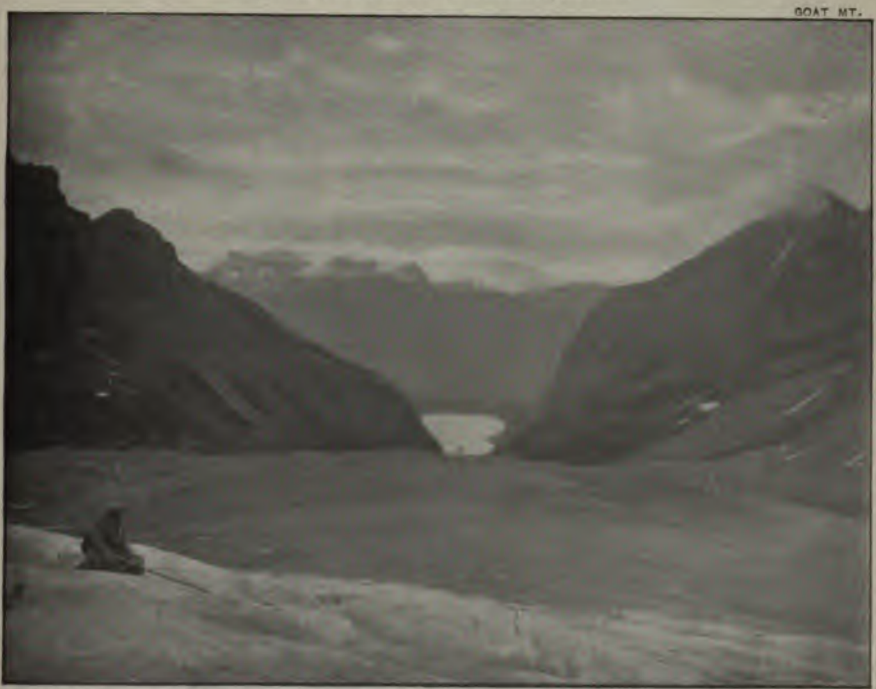
The bottom of that chimney was a deep, huge, old-fashioned fireplace, whose flue, contrary to the usual fashion, ran diagonally upward from the left-hand corner. To complete the likeness, a sharp ledge ran forward from the back like a tarnished andiron whose mate was missing. With that missing andiron all suggestion of warmth, comfort, and good cheer vanished. The flue served as the drain-pipe of a torrent of melted snow water whose main stream fell with no uncertain sound upon the top of the andiron above mentioned. From every channelled groove in the overhanging cliff dripped straggling rivulets, permeating the atmosphere with a moist unpleasantness depressing to perceive. In the face of such inhospitality Professor Fay faltered. My unchilled ardor pleaded for an advance, and Abbot — nothing loath, I fancy — plunged forward. But has it not ofttimes been quoted that "pride goeth before destruction and an

doubtful indeed whether the tongue can be safely passed after the first of August. The lapse of one night transformed it, for us, from a feasible bridge, if carefully taken, to a passage involving a wholly unjustifiable risk. It ought also to be said in explanation of our attempt on the right-hand chimney that, after we saw the condition of the snow, and particularly after it began to drizzle, we had all, I think, — certainly I can speak for myself, — given up the idea of reaching the top. But we were still anxious to prove at least that a way could be forced from the couloir to the top of the plateau. My own belief is that this will hardly be done by the right-hand chimney. The supply of snow above it is inexhaustible, and melting always goes on. In warm weather the amount of water which falls is almost prohibitory. Moreover, from where I stood when we turned, the upper rocks did not look inviting, and the wall up which I was trying to find a way was not only rather bad in itself, but even on that sultry morning was partly glazed. In cold weather the glaze will be everywhere. We cannot say that this chimney is impossible, but it ought not to be tried unless the other one completely fails. — P. S. A.



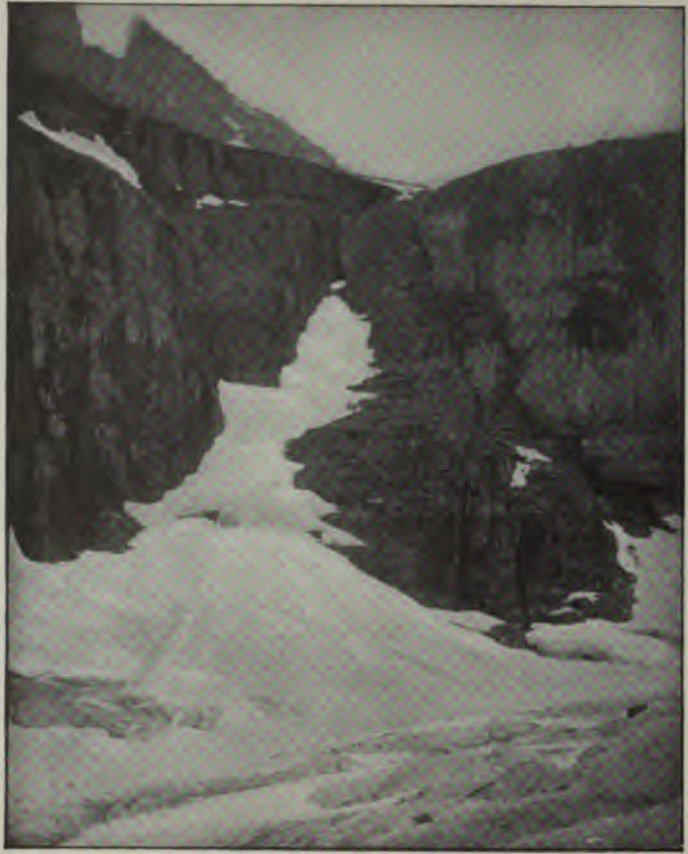
MT. LEFROY FROM ABOVE THE BEEHIVE.

From a photograph by H. G. Peabody, Boston.

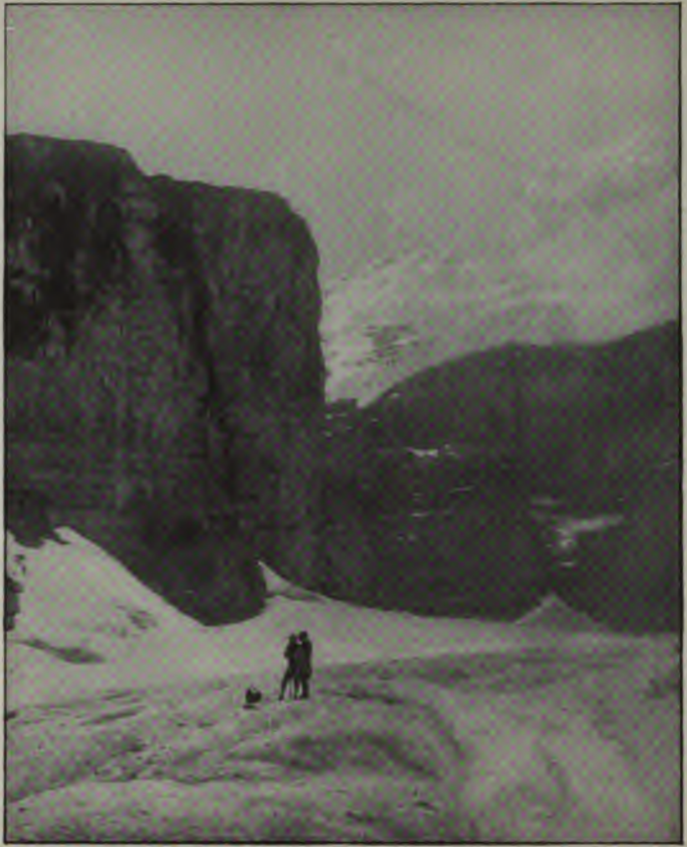


DOWN THE GLACIER FROM THE BASE OF THE COULOIR.

From a photograph by Charles S. Thompson.



THE COULOIR OF MT. LEFROY, AUGUST 3, 1896.



THE "RELATIVELY INSIGNIFICANT CLIFFS."

From photographs by Charles S. Thompson.

haughty spirit before a fall"? My subsequent experience is respectfully offered to ecclesiastical fellow climbers as a remarkable example of the efficacy of baptism as a means of conversion.

To enter the flue, it was necessary to pass upon the andiron. Abbot hastily climbed thereon, and with superlative celerity leaped to the opposite wall; another step, and the tightening rope constrained me to follow. I have bathed in Passamaquoddy Bay when a corked bottle of water dragged astern cooled to the drinking-point, I have taken baths of ice-cold Lake Michigan water with set teeth and undismayed determination; but the chill of that falling torrent was beyond endurance. Instantaneously the water established a complete connection between the neck of my sweater and the knees of my knickerbockers, small rills trickled past my nose, my fingers poured forth water at every tip, and my whole person became a living representation of the god Aquarius.[1] Below, from the cavernous depths on the right, a begoggled soot-besmeared troglodyte enjoyed with fiendish delight my imminent discomfiture. I could neither advance nor retreat. Retreat would have dragged Abbot from his insecure footing; advance was equally impossible, for Professor Fay seemed disinclined to budge from the comparative dryness of his cavern home. Slowly, amidst the conflicting emotions of sudden chill and copious mouthfuls of ice-water, came the fateful words, "Abbot,—I—think—that—I—will—cast—my—vote—with—Professor—Fay."

Why linger over the details of our dripping retreat, of our subsequent wanderings on the Green Glacier, of our half-tempted glance up the Death-Trap?[2] For us that year

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[1] Thompson speaks as though he were the only wet man in the party. My recollection is that I could have overmatched him, gallon for gallon.— P. S. A.

[2] The Death-Trap, so named from the ice avalanches which fall from the cliffs of Mt. Green on the south, is the narrow snow pass which separates Mt. Green from Mt. Lefroy on the north. It has never been crossed. Mr. S. E. S. Allen reached the top without difficulty in 1894, from the western side of the watershed. My impression is that we went a little farther up the Green Glacier than any previous party which has left records; at all events, we are convinced that by keeping near the cliffs of Lefroy, from which no ice falls,

Lefroy was not to be. Yet not least among the pleasures of that summer's holiday are the memories of those unsuccessful struggles, and, despite the long winter's separation, my heart goes out for another wooing. Perhaps under more auspicious skies we may win, if not the heart, at least the head, of that fair mountain. And if that day comes, may Charles the alert and Philip the cautious be there with me! For in such a courtship our keenest rivals become our dearest friends.

An Ascent of Goat Mountain.

By Ellen S. Field.

Read December 13, 1895.

Monday, August 1, was an ideal mountain day, clear and cool, the sun shining brightly, with masses of white clouds piled high in the sky. Lake Louise lay calm and still, with not a ripple disturbing its shining surface. Its silvery-green waters were like a mirror, in which was reflected the rounded crest of the Beehive on the right, with its gray walls so brilliantly striped with red and brown, and on the left the dark, forbidding mass of Goat Mountain, whose frown-

a perfectly safe and exceedingly picturesque route can be traced to the point reached by Mr. Allen, thus completing the col. Whether the summit of Lefroy can be reached from the col is another question. Mr. Allen reports that immediately above him was a slope of fifteen hundred feet of hard gray ice. From our point of view, it seemed as though a traverse toward the northwest — that is, in the direction of the cliffs above the couloir — would present no insuperable difficulties, and would enable us to reach the plateau at the head of the cliffs and join our original projected route. The plateau rises gradually, in an easy slope of snow, toward the east, and appears to abut against a broad rib of rock which runs up to the backbone of the mountain. This is a long crest, mainly of snow, and requiring care because of cornices. The summit is some distance south of the head of the rock rib. Once on the plateau, the probabilities are in favor of success. Whether the plateau can be reached from the Death-Trap col can only be learned by trying; it is worth the experiment, and the route would have this advantage, — that it could be taken late in the season, as the couloir route cannot. It should be said that both Mr. Allen and Professor Fay are doubtful as to the traverse. — P. S. A.

ing buttresses rise in talus and cliff directly from the lake. At the head of the lake, and framed as it were by Goat Mountain and the Beehive, rose the stupendous glacier and snow covered wall of Mt. Green, its five thousand feet of seemingly sheer height doubled by its reflection in the lake below. Neither words nor pictures can give one the faintest conception of the combined grandeur and beauty of the scene.

To row out on the lake in the early morning is a never-to-be-forgotten experience. The boat seems poised in mid-air, surrounded above and below by the mountains and sky. Away from it, stretching out on all sides, is the wonderfully clear silvery blue-green water. The oars touch its sheen; the boat moves gently forward, and grounds at length on a tiny sandy beach at the opposite end of the lake from that at which the chalet is situated. On the shore just beyond the beach and below the Green Glacier, is a flower-garden of blue forget-me-nots. As we gather them, we are frequently startled by peals like those of heaviest thunder, though we are under clear skies; but we soon discover that they are caused by the falling of great masses of the hanging glaciers plunging over the distant cliffs of Mt. Green.

But on this particular August morning we were not to explore the glacier; we were to climb Goat Mountain, and so, after an early breakfast, we were ferried across one end of the lake, while Mr. Astley, our cordial host, forded the river with the two horses. One of the horses carried the lunch, while the other bore one of our ladies, slightly indisposed as to body but undaunted as to spirit. From the edge of the lake we passed through a brief stretch of swampy land before gaining higher ground and the trail. The ascent began immediately, as in these mountains all ascents do; and we climbed steadily up, up through the beautiful forest, pausing every now and then for breath and to admire the delicate wild flowers and exquisite mosses with which this part of our path was carpeted.

At first the trail led through deep woods, where no outlook could be had; but eventually a small clearing was reached, and there we had a most charming view of the Bow River valley, with the crags and snow fields of Mt. Hector in the background. As we climbed on, the forest grew thinner and smaller, and by the time we had reached the second outlook we were nearly above tree-line. Behind us towering cliffs now rose abruptly, and we were told that we must climb above these in order to stand on the summit of Goat Mountain. This prospect had a quieting effect on us, and we climbed steadily on, the path growing steeper, ever steeper, until in places we were almost forced to go on hands and knees. As we emerged from the forest, we saw before us a steep lawn-like slope, rounding down to us from the sky and patched all about with snow. Scrambling up this incline, we gained a grassy plateau, perhaps one thousand by fifteen hundred feet in extent, and were told that we had reached the Saddle, our half-way point and lunching-place. After a brief rest we crossed the Saddle, and seated ourselves on the flat surface of a rock which overhung the deep gorge and broader vale below us. "Paradise Valley" this latter has been named, and we were one and all tempted to enter, — only the slight descent of a thousand feet or more preventing! In front and directly opposite rose the impressive precipitous sides of Mt. Sheol. As we looked, a rock avalanche started, the stones skipping lightly from point to point until lost in the green depths below. Beyond Mt. Sheol towered Mt. Temple with its shining snow cliffs, and at its base nestled the tiny green gem Lake Annette. The valley is hemmed in on all sides by snowy mountains, whose stern, rocky walls and impassable cliffs make it almost impregnable. Just to the right of Mt. Sheol stood the sky-piercing pinnacle of Hazel Peak, with its steeply sloping glaciers, and still farther to the right rose Castle Crags, connecting Hazel Peak with Goat Mountain. Down the length of Paradise Valley a silver stream threaded its way; and the whole made a picture of beauty, grandeur, and utter isolation which once seen will never fade from the memory.

The horses having come up, we turned our backs on Paradise, and returned to the Saddle and a convenient snow patch, where lunch was eaten. The dog of the chalet, our companion for the day, amused himself by chasing a coney under a rock, where he and several members of the party tried in vain to dislodge him. Behind us and on our left towered the rocky cone which must be climbed before we could stand on the desired summit. It did not look unlike that of Mt. Washington as seen from the Alpine Gardens, the rock fragments being piled in the same confusion, though the paths of the Rocky Mountain goats were not at all familiar, nor yet the long stripes of old winter snow still gleaming amid the waste of broken rock.

Climbing the cone was hard work. The rocks were not large, but the slope was very steep, and all climbed very slowly, — all save Alice, the youngest member of our party, a girl of twelve years. Over this hardest and steepest part of the mountain she skipped like one of the mountain's own goats, and was the first to stand on the summit, where the others did not arrive for several minutes.

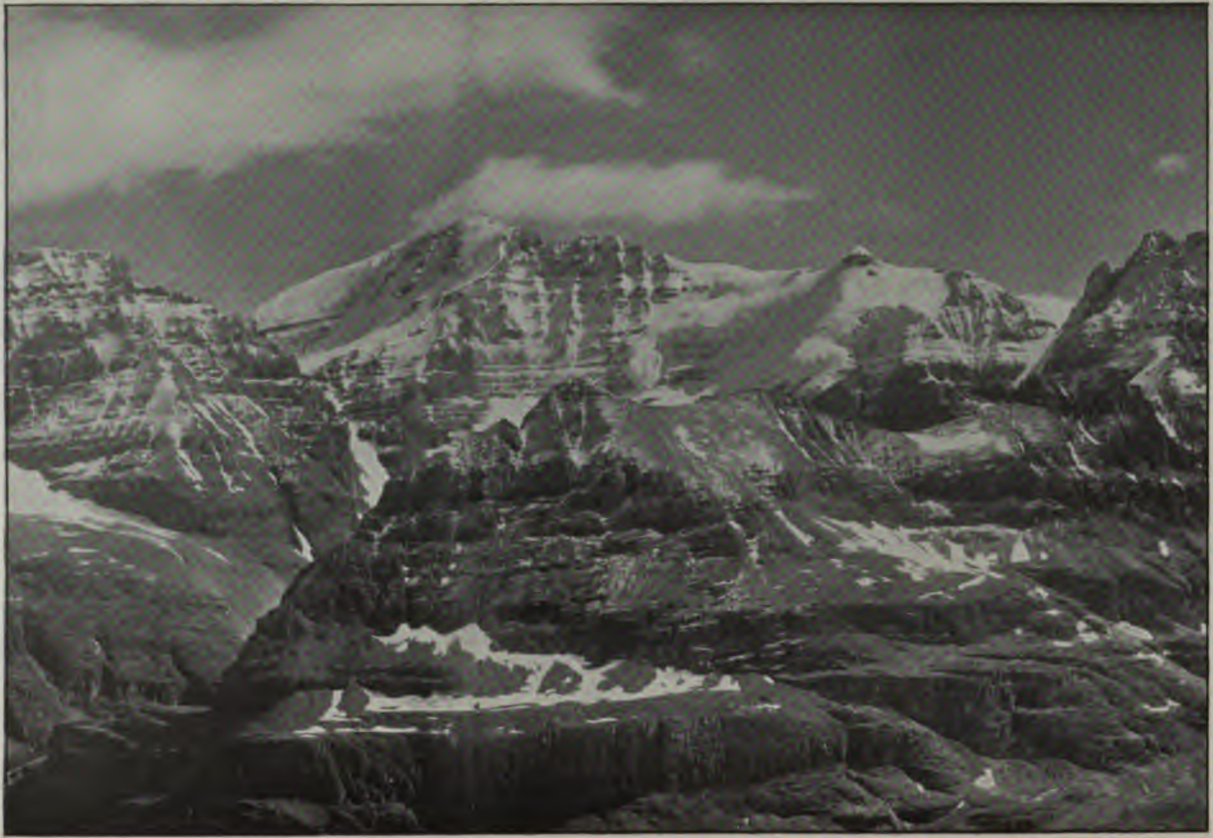
The panorama from Goat Mountain is quite beyond my power of expression. Imagine surrounding us on all sides a wilderness of sharp, jagged, snowy peaks, some of them piercing the sky, with deep ravines, and shadowy valleys. There is no light coquetting of the wind among the tree-tops. The tall, dark forests so far below us seem more like grass than trees. All is silence and desolation. Wrapped in contemplation of the great front of Mt. Green, with its terraces of glacier faces from one hundred to two hundred feet thick, we descended a few feet from the summit on its opposite side, where the faint murmur of distant running water reached our ears, and looking far below us we saw the glistening thread of a stream proceeding from the foot of the Green Glacier and ending in a delta at Lake Louise.

The glacier stretched its entire length before us. Close under Mt. Green lay the white névé snow and the shattered remnants of the hanging glaciers thousands of feet above; but this soon merged into the great gravel and boulder covered surface of the glacier, which crowded its huge form down the valley ending at its foot in the great desert moraine. Certainly no more comprehensive view of a glacier could possibly be obtained.

The descent of the cone would have taken nearly as much time as the ascent, had it not been for the sliding in the snow. Two of our leaders had brought with them their ice-axes, that they might show us the art of glissading. As the snow-fields were not at all extended, there was no danger of crevasses, and thus we should see only the fun of glissading without any of its possible risks. The two leaders seated themselves in the snow, their feet straight out in front of them, their ice-axes trailing behind, and glissaded over the changing angle of the slope out of sight. It looked so very simple, besides being evidently very expeditious, that one or two of us thought we would try it; coming to a convenient snow-patch, we seated ourselves and slid down in a few minutes over what had taken us nearly an hour to ascend.

The snow did not extend quite to the Saddle. As we clambered over the few remaining rocks, we were startled by two shrill whistles close at hand. Looking, we saw two marmots, — pretty little creatures of a soft gray color and somewhat resembling a New England woodchuck. They were very curious, and, sitting upright, watched us attentively as we cautiously approached, until, just as we thought to touch them, they whisked about and in a second had disappeared into a crevice in a rock. As we paused on the Saddle to look back at our trail left in the snow, we were surprised to see that it had assumed a distinct reddish color. Investigation in snow nearer at hand demonstrated that whenever it was disturbed it would plainly show this peculiar pinkish tint. Our attention being called to it, we could trace it faintly over snow that had not been disturbed.

As long as the snow lasted, glissading was the order of the day. The last and longest strip was by far the steepest. So steep was it that when seated at the upper part it was impossible to see over the bowling curve of the slope to the lower end, which ended in a brook of running water and amid mossy boulders. The first two or three who slid down its length wore a path as smooth as a toboggan chute; and as the others followed, one by one, their velocity was so great that they could not stop. When about half-way down



MT. LEFROY FROM ABOVE CATARACT PASS.

From photographs by the Canadian Topographical Survey.

they would lose their balance, their look of pleasure changed to one of fright, and down they came on their backs, sideways, and every way but the right way, — straight into the brook, had it not been for friendly hands outstretched to stop them. The last one to slide was a large man, one of Boston's well-known lawyers. As he seated himself to slide, Kodak in hand, his very spectacles beamed with anticipated pleasure. Down he came with really amazing velocity. But the rest of us, gathered at the foot of the slide, saw nothing but the ludicrous; for, as he realized he was losing control of himself, his smile vanished, his spectacles shone with terror, his head dropped back, his feet tipped up, his Kodak flew off at a right angle, and with a wild cry of "Catch me, I 'm coming," he shot through all detaining hands straight into the brook. He was a very wet man as he picked himself up, not at all sure of what had happened to him.

This was the last of the snow, and the remainder of the descent was quickly made; the shore of the lake was reached, the boats hailed, and once more we stood on the piazza of the little chalet, a tired and happy group of people who had just had one of the most delightful days of our lives. As we looked up at the dark summit of the mountain towering above us, a gleam of sunshine touched a snowy rock and the mountain smiled good-night.

The Casualty on Mount Lefroy.

By Charles E. Fay.

Read October 21, 1896.

Under what circumstances is the approach of Death more tragic than when his hand stays the seeming victor already reaching forward to grasp the prize? What scene for the passing of an aspiring soul more sublime than a vast amphitheatre of mighty snow-clad peaks gazing solemnly from near and far in the paling flush of the dying day towards a single spot in their midst, awful in their grandeur, yet possibly half conscious of Monadnock's profound confession that

"... no mountain can
...... measure with man."

Thus, and amid such surroundings, died Philip Stanley Abbot, *facile princeps* as a mountaineer among those enrolled in our corporate membership.

Those who visited the Canadian Alps with our Club party in 1895 will never forget his fine enthusiasm and glad activity in those memorable days. Knowing the best of Switzerland by an intimate experience, familiar with the grandest mountains of still other portions of the globe, possessing thus the truest criterions of comparison and kept by his native clear-sightedness and strong common-sense from unsober overestimates of what presently filled his eye, he recognized on that first visit the true grandeur of this region, and rejoiced as at a new and priceless discovery in the realization that within four days of the Atlantic seaboard there lies another and a virgin Switzerland. With what a discriminating vision he estimated its deficiencies as well as its splendors is evident to those who read his story of the first ascent of Mt. Hector.[1]

The article just cited closed with a promise to return another year to make the ascent of the beautiful snow peak we had seen from the summit of Mt. Hector rising in reposeful grace out of the immense snow-field of the Waputehk mountains. This conquest of Mt. Balfour, to be combined with an extended exploration of the unknown névé itself, became the principal motive of our most recent visit to the region. But closer to Abbot's heart than all this lay the renewal of that attack on Mt. Lefroy so genially described by Mr. Thompson in this same issue of APPALACHIA. To those of us who enjoyed his correspondence in the interim it seemed as though he dreamed of Lefroy by night and planned campaigns against it in the leisure moments of his active professional life. Among his annotations of Mr. Thompson's

[1] See APPALACHIA, Vol. VIII. p. 1.

narrative we find indications of the trend of his planning. A bolder line of assault, involving more of the unknown and promising a more serious demand upon his knowledge of Alpine craft, is leading him to care less for a renewal of the attempt by the couloir than for a new trial by way of the "Death-Trap Col."

A glance given last year into this grim *cul-de-sac* had assured him of the feasibility of the ascent to the col from the Green Glacier, contrary to the supposition of Mr. S. E. S. Allen, our fellow-member, who in 1894 had reached it from the other side of the watershed and erected there a monumental cairn, — destined, as it has proved, to other service than to commemorate the first visit of man to this inhospitable spot. From this coign of vantage Mr. Allen had seen the western slope of Lefroy near at hand, and had judged the ascent of the peak from this side to be impracticable by reason of the great amount of step-cutting that it would involve. This seeming prohibition was to Abbot an alluring invitation. The game of ascending Mt. Lefroy by any other way than this was not worth the candle to him, at least not until this way should have been shown to be beyond our powers by an actual test.

All scepticism and reluctance succumbed to his enthusiasm and witty logic after our second slight reconnoissance of the Death-Trap, on Saturday, August 1. After a long debating of the pros and cons, it was determined, as we returned over the now familiar way to the chalet, to attack Lefroy on the following Monday by Abbot's route; failing in this, another trial should be made later on by the couloir, which, by reason of a complicated schrund developed since our last year's visits, would offer some new problems at the very outset. Despite the disastrous issue, the trial proved the correctness of our leader's forecast, the reasonable foundation of his eager faith, for the peak was virtually won when, as it would almost seem, an envious Fate, in league with the hitherto unconquered giant, hurled the bold deviser to his death.

Monday, August 3, dawned fair, and our party rose at about five o'clock. To our trio of last summer there now was added Professor George T. Little, a man experienced in such rock climbing as our Eastern mountains afford, and who a few days before had passed a triumphant initiation into snow-and-ice work in the Selkirks by making with Abbot and Thompson the first ascent of Rogers Peak, the highest of the Hermit range. While we were breakfasting, phantoms of mist hovered over Lake Louise, gathering at length into a horizontal cloud drawn like a band across the cliffy façade of Mt. Green, while above it the mountain's snowy pediment gleamed dazzlingly white in the rays of the newly risen sun. Two of our cameras faintly caught the splendor that ushered in the day.

It was 6.15 as we pushed our boat away from the float and out upon the unruffled waters, and but half an hour later when we moored it in the little cove to the left of the inflow of the glacier stream, and assumed our packs for the toilsome march over the stranded delta, over rock-fall and wreck-strewn higher flat, over high-piled moraine and patches of old winter snow, along the northwest side of the fawn-colored ice of the "dry" glacier, to a point perhaps a third of a mile from its foot where an easy access is given to its boulder-covered surface by upreaching tongues of the lateral moraine. It was 7.30 as we trod the ice, and 8.40 as we paused to put on the rope opposite to the foot of the familiar couloir. As we roped, our eyes were scanning the shattered base of the cliff to the right of the schrunded snow-slope, seeking, and not unrewarded, for possible alternate routes in case we should return in a few hours baffled by obstacles as yet unknown. The aneroid registered 7,450, some 1,500 feet above Lake Louise.

Very few visitors to this region have passed beyond the point where we now stood. Beyond the couloir the "dry" glacier ceases and the bridged crevasses are more or less concealed. Along the base of the huge buttress of Lefroy drifted snow is packed deeply over the ice; just as on the right under the far loftier cliffs of Mt. Green a deep mass of mingled snow and rounded blocks of bluer-tinted ice, thinning out as it recedes from the base of the precipice, has buried the true glacier under the débris of continual avalanches. Their source is the hanging glacier whose edge, flush with the vertical cliffs, is seen as a blue-white hem, now even as if cut with a cleaver, now fractured into fantastic séracs.

The highest part of the buttress of Lefroy marks the turning of the upper Green Glacier as it issues from the Death-Trap, the vertically walled gorge which lies between the southern half of the ridge we call Mt. Green and the northern portion of the true Lefroy, that lie parallel with each other as the crest of the Great Divide "loops hesitatingly toward the north." On the left the cliff rises sheer as well-laid masonry eight hundred feet above the snow; on the right no less vertically in a vast, almost unbroken face nearly a mile in length and averaging at least a thousand feet in height, while in places it doubtless reaches fully twelve hundred. Above it along the entire front extends that threatening hem of ice, from which, as we have seen, the fall of avalanches is almost incessant. The crags of Lefroy, on their side, harbor no hanging glaciers, save at a single place more than half-way up the gorge. Consequently, while the wreckage of recent downfalls occupied the western side of the floor, sometimes in the case of the largest encroaching well beyond the median line, there was almost no trace of them upon the eastern side. Along this side, therefore, we held our way, pausing not infrequently as a sharp crash high above us announced the fracture of some portion of the overhanging margin of ice. Instantly our eyes would seek the source of the sound, and shortly would discover a narrow cascade of whiteness leaping down the immense rock face on our right, — a seemingly inadequate occasion for the portentous rushing, thunderous sound that attends its flight to the bottom of the abyss. Occasionally a grander display was presented, as when a larger mass, descending somewhat more slowly by one of the rare side gorges, came rushing on preceded by a thick cloud of snowy mist, the fine dust of pulverized ice borne forward by the swirl of wind that the avalanche itself had created. The attendant sound is by no means tranquillizing, and long before our day was ended it had become almost intolerable.

We were now gaining rapidly in altitude, and our course was due south. Up to the turning-point at the buttress the direction of the axis of the Green Glacier is northeast and southwest; in the Death-Trap it is due north and south; as a consequence, we have here a pass crossing its range parallel instead of perpendicular to the General axis. At the turn the surface of the ice is about 7,500 feet above the sea, and below this point the ascent has been so moderate as to seem almost level. But looking up the gorge a very different slope meets the eye, as the snowy floor rises nearly 2,500 feet in the possible mile and a quarter that must be traversed before reaching the finely drawn line where white cuts blue on the top of the pass.

This gradient, while tolerably uniform, steepens in a few places so much as to render the stamping of steps desirable; but for the larger part of the way this labor was unnecessary. In general we found this rapidly sloping névé free from any considerable crevasses, save at two points, where broad schrunds yawned nearly across the narrowing gorge. Both these were bridged, the first sufficiently firmly at its left end; the second less satisfactorily, for the bridge was sunken some two feet below the lower verge and required to be crossed on all fours. This crevasse was a beautiful specimen of its kind, if not imposing in its dimensions, — perhaps twelve to fifteen feet in width and forty to fifty feet deep. It was proposed to lower one of our amateur photographers into its pure depths to secure a copy of its delicately groined architecture; but eagerness to know what lay before us led us to postpone this matter until our return. How little we foresaw when and how that return would be made!

At 9.20 we had reached a point shown by the level to be even with the top of the great buttress. The aneroid now marked 8,350,[1] so that we had climbed nine hundred feet in the forty minutes that had passed since putting on the rope. We were still somewhat below the single place where danger could threaten from the eastern side, thus besetting us at once on left and right, and if a rest were to be taken, now

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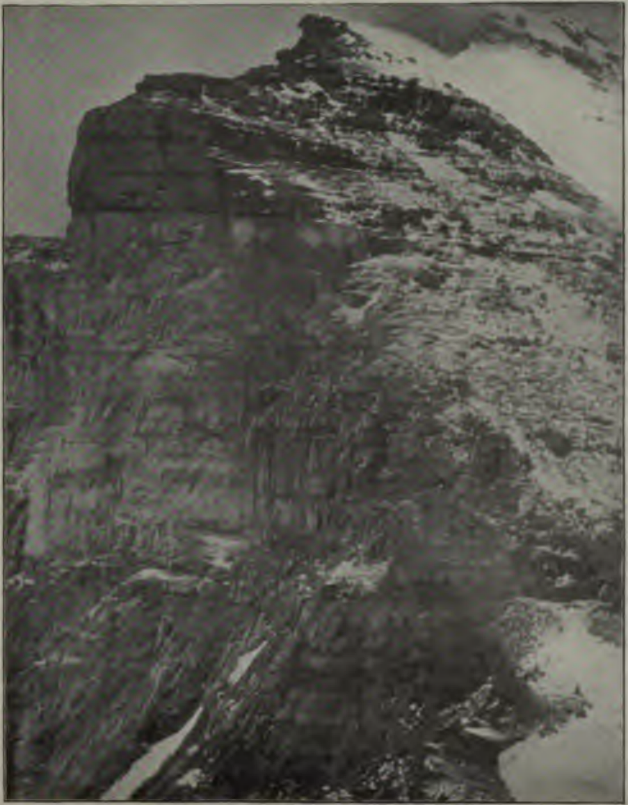
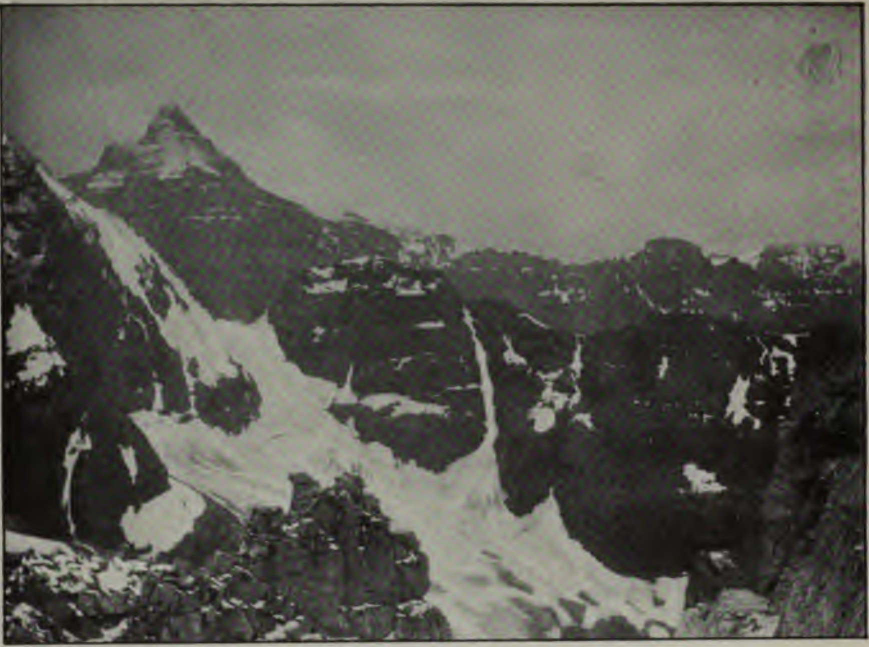
[1] This record also gave us a datum for determining the height of the buttress itself; for, estimating the rise of the glacier from the foot of the couloir to the turning-point at 100 feet, the sheer height of the cliff was fully 800 feet.

THE "DEATH-TRAP."

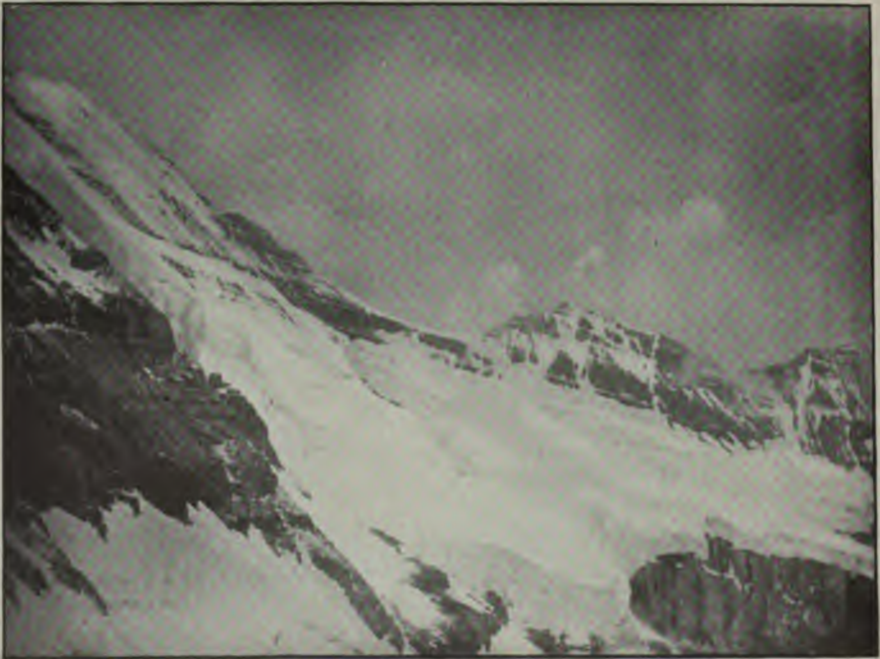


WESTERN WALL OF ABBOT PASS.

From photographs by Charles S. Thompson.



LOOKING SOUTH FROM ABBOT PASS.
From a photograph by Charles S. Thompson.



LOOKING NORTH FROM ABBOT PASS.
From a photograph by Charles S. Thompson.

was the proper time rather than later on. Here, therefore, we made our first real halt of the day, spending a quarter of an hour in eating our first luncheon and in photographing.

Starting on refreshed, we kept our upward way almost without a halt, save as we paused to admire the two great crevasses already mentioned or to take an occasional observation with the level.[1] At length, as high noon was approaching, the snow-slope began to grow less steep, and our spirits rose yet higher in joyous expectancy. Just beyond us on the right, two small crags were outlined against the sky. One was the lone remnant of the once higher head wall of the gorge, the other a work of human hands, the cairn of Mr. Allen. Only thus far to two new sensations! One sure to be almost overwhelming in its sublimity as our contracted forward view should suddenly open and reveal the grandeur of the mighty peaks beyond the Divide; the other problematical. Would it be a sudden, still greater access of joy and hopefulness, or a deep disappointment? A moment more determined it. At 11.50 we stood on the crest of the short yoke that connects Mts. Green and Lefroy, with our aneroid registering 9,850 feet of altitude.[2]

Almost before our eyes had taken in the wonderful prospect that opened so magically — the sudden plunge of the western gorge, snowless in its upper half, its sloping sides and narrow bottom lined with scree from the heights above; the sea-green lakelets at its foot, three thousand feet below us; the pinnacle of Mt. Biddle leaping up like a petrified flame and pricking the clouds that levelled with the tops of

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[1] Some interest attaches to two observations made, one at 9,250 feet, from a point level with the bottom of a certain part of the hanging glacier on the cliffs of Mt. Green, the other at 9,450 feet, from a point level with the top of the same ice. From these it appears that the ice-hem here showed a thickness of 200 feet. This, however, is probably not a maximum.

[2] Our morning's work, united with that already performed by Mr. Allen, had proved it a true pass, — one of the highest and grandest of the Continental Divide. In view of this discovery, and to perpetuate in the region the name of him who really made it and died at a point in full view from the crest, it has been proposed to drop the name of Death-Trap Col, and employ hereafter a happier one, — "Abbot Pass." Mr. S. E. S. Allen, by whom the existing name was given, and who has used it in his map of the Lake Louise region, has expressed himself as heartily in sympathy with such a change.

Green and Lefroy themselves; the remoter array of peaks unfamiliar in this new aspect — Abbot had scanned the western side of Lefroy, now for the first time clearly revealed to us, and joyfully exclaimed: "The peak is ours!" And surely his confidence seemed justified. From here an unobstructed way was seen leading up to the long summit arête, which still frowned nearly two thousand feet above the pass. The vast mountain side rose in a sloping wall, ice-clad for the greater part, yet with here and there long upward leads of rock[1] that probably could be scaled, as the dip was in the right direction. Assured of what it lay nearest to his heart to know, Abbot now turned his attention to the grand spectacle, and his enthusiasm found ample expression in that ever happy smile, his beaming eyes, and his quiet remark — and what was ever so convincing as that confident, almost childlike mental repose? — that nowhere had he ever seen that view surpassed for striking Alpine effects.

Immediately to the left of the pass the line of the watershed rose abruptly some two hundred feet over a promontory, whose farther side was a precipice but that towards us a steep slope utterly buried under large angular blocks of rock. As serious climbing would not begin until we had surmounted this height, we kept on, after brief delay at the col, to a point near its top, where we paused for our noon meal. This slight addition to our altitude (now 10,100 feet) had opened up new vistas: the alluring monolith of Mt. Goodsir in the southwest; to the north Mt. Hector, refusing to lay aside its summit-veiling cloud, as if to spite its vanquishers; the vastly extended outlook over the snowfields of the Waputehk mountains, that we confidently believed our feet would press on the morrow; Mt. Balfour, seeming to proclaim from afar the ease of the victory we might hope to win ere two more suns should set.

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[1] It is probable that these rocky spaces were under snow at the time of Mr. Allen's visit, just as they appear in the photographs of the Topographical Survey of Canada, from two of which Plate XX. has been reproduced. This would give ground for the inference referred to on page 135, that the amount of step-cutting rendered the ascent from the pass impracticable. The course taken by our party from the col to the bastion is indicated on this plate.

At 12.30 P. M., leaving behind us two of our rücksacks with the remainder of our food and whatever else seemed unnecessary for the hours that we were expecting to be absent, we again set forth to complete, as we fondly believed, the largest enterprise in the way of mountaineering that has ever been accomplished on Canadian peaks. Our record shows that in the first half-hour we made excellent progress, for at one o'clock our aneroid reading was 10,400, three hundred feet above our lunching-place. The point at which it was made is one that will never fade from our memory, — the top of a low cliff, beyond the brow of which and somewhat higher up lay a narrow plateau covered with scree.

Of the next four hours and a half the writer of this narrative has a very vague recollection. Did not our record exist as a corrective for deceitful memory, I should without question underestimate the period fully one-half, either because it actually passed so quickly, or because in reminiscence the monotonous affords few halting-points, and so falsifies time just as the plains and the open sea falsify distance. These hours were spent either in cutting steps in our zigzag course up ice-slopes, or in wary advance up the unreliable slopes of rock, the effect of a slip upon which would differ slightly in ultimate results from a slip on the ice itself. Usually one moved at a time, the others maintaining meanwhile as secure an anchorage as possible. Caution governed every movement, as indeed it always did when Abbot was at the fore. On this day we were all deeply impressed with its needfulness. Even our leader smiled at the enormous size of the steps that were left in the wake of the party after each one had contributed his vigorous chipping to their enlargement. Some one, thinking of the possible lateness of the return and consequent necessity for speed, suggested that we might need all the advantage their size would offer when we came to descend. So indeed it proved!

At 5.30 we drew up under an immense bastion possibly seventy-five feet in height,[1] behind which lay the summit, of which as yet, owing to foreshortening, we had had no satisfactory view. This frowning face rose sheer from a narrow margin of tolerably stable scree that lay tilted between its base and the upper edge of the sloping ice that we had just left behind us. Looking past it on the right we saw, a few hundred feet beyond, the tawny southern arête, so shattered as to be utterly impassable. In one place a great aperture, perhaps forty feet high and five or six in width, revealed the blue sky beyond. Evidently our course did not lie in that direction. On the left the dusky northern arête rose with an easy gradient possibly an eighth of a mile away, but across an ice slope similar to that up which we had so long been toiling, and in truth a continuation of the same. To cross it was perfectly feasible, but it would take so long to cut the necessary steps that a descent of the peak before dark would have been out of the question.

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[1] The last reading of our aneroid taken at this point gave 11,300 feet. The preliminary calculation of the Topographical Survey gives to Lefroy an altitude of 11,260 feet.

But now Mr. Abbot, who had moved forward along the rock-wall to the limit of the rope, cheerfully announced an alternative. His view beyond an angle in the bastion revealed a vertical cleft up which it was possible to climb by such holds as offered themselves. Bidding Thompson and me to unrope and keep under cover from falling stones, he clambered some thirty feet up the rift, secured a good anchorage, and called upon Professor Little to follow. This the latter proceeded to do, but while standing at the bottom of the cleft preparing to climb, he received a tingling blow from a small stone dislodged by the rope. A moment later a larger one falling upon the rope half severed it, so as to require a knot. As danger from this source seemed likely to continue, our leader had Little also free himself from the rope and come up to where he stood. From here a shelf led around to the left, along which Abbot now proceeded a few yards and discovered a gully leading upward, unseen from the point first attained, and this also he began to ascend. To Mr. Little's question, whether it might not be better to try and turn the bastion on the shelf itself, he replied: "I think not. I have a good lead here."

These were the last words he ever uttered. A moment later Little, whose attention was for the moment diverted to another portion of the crag, was conscious that something had fallen swiftly past him, and knew only too well what it must be. Thompson and I, standing at the base of the cliff, saw our dear friend falling backward and head-foremost, saw him strike the upper margin of the ice slope within fifteen feet of us, turn completely over and instantly begin rolling down its steep incline.[1] After him trailed our two lengths of English rope — all we had brought with us — which we had spliced together in our ascent over the last rock slope, in order to gain time by having less frequent anchorages than were necessitated by the short intervals of one sixty-foot line. As the limp body rolled downward in a line curving slightly towards the left, the rope coiled upon it as on a spool, — a happy circumstance amid so much of horror, — for not only did this increase of friction sensibly affect the velocity of the descent of nine hundred feet to the narrow plateau of scree above mentioned, but doubtless the rope by catching in the scree itself prevented the unconscious form from crossing the narrow level and falling over the low cliff beyond. Had it passed this, nothing, apparently, could have stopped it short of the bottom of the gorge leading up to the pass from the western side of the Divide, — a far more fearful fall than that already made.

You would not pardon me if I could find words to describe our feelings. A single instant of supreme emotion may equal hours of grief or joy less intense. A single instant only was ours to yield to it. Mr. Little was still in a critical position, particularly if his nerves were unstrung. To ascend such a cleft is far easier than to descend, and he had had the aid of the rope in going up. He must forgive me if I mention here the self-forgetfulness with which he called down to us: "Never mind me. Hurry to help Abbot." "Our help is for the living. To reach Abbot will require hours. Everything must be forgotten save care for the present moment. Come down as far as you can with safe holds, and, Heaven helping, we will do our part." Happily the footholds lasted until he was far enough down to reach with his hob-nailed shoe an ice-axe held braced against a projection by one of us who had crowded himself for a purchase into the base of the cleft. Another axe under his thigh and such handholds as he could grasp aided the remainder of the perilous descent. It was 6.30 as we stood together with grateful hearts at the base of the fatal bastion.

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[1] How the terrible disaster occurred we shall never know. In all probability his foothold, or more likely his handhold, gave way; though it is not impossible that he was struck by a stone descending from above. The facts that no outcry preceded his fall and that the fatal wound was on the back of his head seem, however, to argue against this latter hypothesis. I know not how to account for my immediate impression, unless I actually saw something to create it during the momentary slackening of his swift rush past us, but it was an increase of horror lest a large stone, clasped in his arms, should crush him as he struck the slope. The visual memory itself is exceedingly indefinite as regards details.

A brief gaze to where Abbot lay so still, a mutual promise of self-command and unremitting caution, and we began our descent with ice-axes only, each responsible for his own safety. Our ample footsteps were now a priceless safeguard. On the treacherous rock slopes we could indeed secure a tolerable substitute for seven feet of rope by attaching two ice-axes together by their straps, a wholly inadequate resource for this dangerous passage. Thus for three hours and until the beautiful sunset glow had faded on the high arête of Lefroy, we worked our slow way downward, and at length stood beside the motionless form that all this time had lain in full view. To our surprise life was not yet extinct. The fatal wound in the back of the head, evidently received in the short initial fall of perhaps twenty feet, was the only grievous outward mark, and the autopsy proved that not a limb was broken. A faint murmur, that my imagination[1] interpreted as a recognition of our presence and an expression of gratitude that we at least had escaped from peril, alone broke the silence for a brief moment, and then we three bared our heads in the twilight, believing that his generous spirit was already passing. But a moment later the faint breathing was resumed.

If living, then of course we would bear him down with us, difficult as the labor would be. We now at least had the ropes, and with their aid such a task did not seem impossible. To tarry in this spot was at all events out of the question. With tender hands, having first disentangled the ropes, we raised him, and began the dreary descent; but we had scarcely reached the brink of the little cliff when he again ceased to breathe. Not satisfied with this evidence, we tested pulse and heart. That all was over in the mortal life of our loved companion was subject to no manner of doubt.

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[1] The autopsy revealed a fracture of the occipital and left parietal bones, with some depression of the former, which renders it practically certain that he was unconscious as he fell past us, and that he never regained consciousness.

The seriousness of the task we had assumed as a matter of course at once became evident. To lower even the lifeless body down this short precipice was a labor involving a large risk for three persons. Only with competent aid and by long daylight could it be brought from its lofty resting-place to the chalet we had left so hopefully that morning. Twilight was deepening into dusk as we decided to leave it here and descend as far as possible before darkness should prevent further advance. By the dim reflection from the sky and the snow we could faintly discern our upward footsteps in certain places; in others merely divine them. The general course avoiding dangerous precipices on our left we could make out without difficulty. We reached without mishap the top of the rock-strewn promontory, but by a strange misfortune all three of us forgot that it was near this point, and not in the pass itself, that we had left our rücksacks with food and our only stimulant (excepting the flask that Abbot had carried, and which had been shattered into fragments in his first fall), together with an extra sweater — an oversight we had occasion bitterly to repent. Not until we reached the col and failed to find our belongings did the truth dawn upon us, and a return in the darkness failed to bring the seeker to the desired spot.

Assembled again at the pass — it was now 10.30 P. M. — we accepted the decree that we should here spend the remainder of the night.

And here, as our narrative tarries, permit me a more detailed description of the Abbot Pass. Grandly beautiful when vivid sunlight illumined its gleaming landscape, it was equally stern and inhospitable in the gloom of darkness mitigated only by the ghostly light from the pale snow-fields. Its width was possibly four hundred feet from the base of the rocky promontory to that of the not utterly inaccessible slopes of the eastern side of the lower (southerly) extension of the ridge of Mt. Green. The intervening floor is not level, but rises from the actual pass, the lowest point, which is directly under the promontory, inclining upward towards the side of Green. It is well up on this western side that the crag and cairn already mentioned are located. On its northern slope, the side from which we had come up that morning, the pass is filled with pure white snow lying at a gentle slope. This sweeps up to the crest line, from which the rocky descent on the southern side is at first exceedingly steep. In a few spots, and principally at the very pass, the snow failed at the time of our visit to reach entirely to the crest. At this lowest point it leaves bare a few square yards of rock strewn with fine débris. Where the cairn stands is a somewhat smaller area strewn with fragments of a size suitable for cairn-building, a circumstance which doubtless determined the location of this monument.

The bare rock of the lowest point of the pass, upon which we now found ourselves, was at least preferable to the snow for a couch, so we lay down upon it face downward. Soon, however, the rising breeze drawing freshly over the col from the north made us long for some shelter from its chill. The cairn would offer a slight defence, and up to it we hastened. Seating ourselves in its lee one close before the other, each held the one in front of him in a close embrace to utilize, so far as possible, our bodily warmth. Often we would lightly pound ourselves, or one another, to increase the sluggish circulation. Now and then Little would rise to stop some chink in the cairn, or even build an extension to our stony wind-break. I should not say that we suffered physically in any very serious sense of the term; we were simply decidedly uncomfortable. Our condition became somewhat the worse toward morning, when the sky became overcast and flakes of fine snow began to sift over us, the forerunners of a storm, the severity of which was fortunately delayed for some hours. The night wore on but slowly.

Occasionally one or another would doze for a quarter or half hour, then, waking, consult the watch and congratulate himself on his happy fortune. By 4.15 it was light enough, despite the cloudiness, for one to move about, and only too gladly I proceeded to overcome my numbness by recovering the rücksacks. Strengthened for the descent by the welcome food — we had eaten nothing since noon of the day before — we set out at five o'clock, and reached the chalet at 9.30 A. M. in the midst of a rainstorm.

Mr. Thompson, without delaying even to enter the house, hastened the remaining three miles to Laggan to telegraph the sad news eastward and prevent, if possible, the transmission of garbled reports. Unfortunately the wires were occupied, so that it was late afternoon before the messages were sent. From this it resulted that some of the nearest friends were first made aware of the disaster by the meagre and inaccurate statements of the morning papers of the following day.

Owing to the storm and the absence of all possible assistance, nothing could be done on Tuesday towards the recovery of the body. Indeed, in the hours of reaction after the trying experience and under the depressing influences of the weather, it seemed for the moment as if it might be necessary to wait many days, or as if all efforts might end in failure. But the next morning (Wednesday, August 5) dawned brightly, and awakened fresh confidence in the possibilities of a successful attempt. In casting about for suggestions, we had remembered that Mr. McArthur of the Topographical Survey was at Revelstoke, a day's journey west of Laggan. One of our earliest telegrams had been sent to him. This morning brought a response, giving the names of two competent men at Morley who might aid us in our work. Particularly cheering was the receipt of a telegram from Mr. Allen, then in Philadelphia, who had read of the accident in his morning paper, and who offered to come at once across the continent if he could be of service.

The summoning of other help was rendered unnecessary by the arrival of Mr. T. E. Wilson, of Banff, and Mr. Astley, who for the five years preceding had been the manager of the Lake Louise chalet. Both had met Mr. Abbot, and he had won their affectionate regard. They came bringing rope and ice-axes, and, although wholly unfamiliar with Alpine climbing, declared themselves desirous to join in the undertaking. Preparations were made with the greatest possible despatch, and at ten o'clock our party of five started on its solemn errand.

Impelled by a sense of the need of husbanding the hours of our greatly shortened day we made rapid progress, covering the distance to the pass in an hour less time than we had taken on Monday. The weather was unsettled, yet with every promise of clearing, and sunshine often brightened our upward way. But on arriving at the col, at about 2.30 P. M., a most unfavorable change took place. Dense mists with snow squalls began to shut us in, and on reaching the top of the rocky promontory, beyond which so much care had to be exercised even in clear weather, it seemed for a time as if we were to be driven back. But shortly the sun reappeared, the mists lifted, and again we advanced.

But the ground to be traversed beyond this point had undergone a notable change since we saw it last. What had been rain in the valley, here on the heights had been a light beautiful snow some three or four inches in depth, such as we see in New England occasionally on a late October morning. On the easy gradient below the pass not quite so deep, it had been an actual aid to our progress, for, easily compacted and welding as it were to the surface of the névé, it had rendered it unnecessary to stamp footsteps. But here at the base of the long, steep upper slopes of Lefroy, it would have proved a source of serious danger, had not the peril already been averted by the occurrence of the avalanche which the conditions so greatly favored. It had swept down from the high summit-arête, and now lay piled in a roughly ploughed avenue some two hundred feet in width right athwart our line of advance. Compacted by the pressure of its stopping, it helped rather than hindered our progress; but where new snow covered the rocks that had been bare two days before, our advance must have been slower, for the time spent in climbing the three hundred feet just above the promontory was double that we then had taken.

And thus it was four o'clock when we reached the place where the body was lying, just as we had left it, save that beside the light drapery of the snow-fall the edge of the avalanche had partly covered it. Had it lain a few yards farther to the north, the descending mass would have buried it from sight, or possibly have swept it with it and concealed it beyond present recovery.

We who had become familiar with the sight which for the moment appalled our two companions, already considerably shaken by the more or less real dangers they had confronted for the first time, prepared the form, to which our feeling of companionship still clung, for the descent. The sleeping bag brought for service in our expected exploration was drawn over it to the knees, and a rope attached above the ankles, by which it was lowered or drawn, always over snow and hence with no rude shocks, to the close of its last journey over Alpine slopes. Even with our increased number, it was a somewhat perilous task, owing to the very insecure anchorage, to lower it down the vertical cliff, at the top of which we had reluctantly left it; hence it seemed preferable to launch it down the snow slope to the right over which we could not follow it. We could safely count on intercepting it below. Whenever it lodged in the avalanche snow, the full strength of our entire party was required to start it again. The descent was slow and laborious. The principal difficulty lay in keeping the body, at the end of its long rope, from sliding over the precipice which lay below our course, or into the crevasses which we crossed. Especially difficult was the passage from the avalanche to a little col separating the promontory from the main slope. The configuration of the ground was that of a shallow hopper, leading down to the precipice overhanging the gorge south of the pass. More than an hour was required to cover a distance of three hundred feet. Very rapid progress was made over the névé from the pass to the foot of the Green glacier, which point we reached at 8.30. To convey our burden farther that night was impossible; so covering it with snow we again left it and kept on our course through twilight and darkness to the chalet, which we reached at half-past ten.

In such tragical surroundings the most modern mind may revert to the primitive state, when the phenomena of Nature seem inevitably interwoven with our own existence and their gloomy aspects are invested with portentous meaning. Nature speaks her mood, and man interprets according to his temperament, — a promise, a warning, a threat. As we were nearing the close of our long journey upon the snow, a circumstance occurred which by its sudden unexpectedness affected us all profoundly. We had issued from the Death-Trap, and were moving across the lower glacier, when one of our number, looking back, called our attention to an impressive sight. Hours before the clouds had dispersed, and the ensuing pleasant weather had put quite out of mind all recollection of earlier storminess. But now a furious storm-cloud came sweeping into the Death-Trap, quite filling it with its dark mists, that seemed rushing out to overtake us. Onward it hastened, but before reaching us the tempest was stayed, and it moved over the ridges of Mt. Lefroy, not touching us even with its hem.

The following morning, Thursday, a party of six bridge-builders, sent in by the management of the Canadian Pacific Railway, whose sympathy and offers of aid knew no stint, went to the point where we had left the body, accompanied by Messrs. Little and Astley, and bore it in a litter over the rough way to the head of Lake Louise, and thence by boat to the little landing of the chalet. In the afternoon it was transported to Laggan and by the evening train to Banff, where on Friday it was embalmed, and the autopsy and inquest held in accordance with the law. Then began the long journey across the continent. On Wednesday, August 12, the remains were laid to rest in Mount Auburn.

Thus closed the saddest episode in the history of our Club, for this is the first fatal accident in its twenty years of existence. It occurs at the very dawn of a new era of genuine alpine climbing, for the extension of which among our young countrymen Abbot was so earnest an advocate.[1] Shall the incipient movement cease because he is no longer with us to work for it, or because he lost his life while engaged in furnishing a brilliant example of what he would foster? We who passed with him this most exultant of all his mountain days have no sympathy with such a conclusion. In our judgment, neither the region nor the boldness of the enterprise is responsible for his death. A similar fall with the same result might have occurred in the White Mountains, or even on the craggy hills of Mount Desert island where in boyhood he went into training for the more ambitious climbs of his early manhood. It is not, of course, to be denied that such climbing as the Canadian Rockies offer involves a larger element of risk, nor that opportunities for a proper schooling are sadly deficient in our country. In certain respects, however, and notably as regards climatic conditions, the dangers here are distinctly less than among the Swiss Alps. We should deprecate, as much as any, a party's venturing upon such enterprises without, at the very least, a leader who has made a careful study of both crag and ice work under competent guides. But after duly weighing all that is urged against Alpine climbing, and while appreciating, none more profoundly, the value of the rare life that went out on Mt. Lefroy, we maintain that the gain therefrom for the general and the individual life in an age of growing carefulness for ease and luxury must be held to outweigh the deplorable losses, and that this casualty should not call a halt in American alpinism. That a man like Philip Abbot should love this form of recreation — and to him it was an education as well — argues for its nobility. Let his death, then, point no moral against it, but rather let it be regarded with the same unquestioning spirit, silent before the mysterious dispensations of the controlling Power, with which we stood a few weeks before when a life of extraordinary promise for the Commonwealth and the Nation found an early end.

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[1] It was his ardent wish to unite by closer ties those of our Club to whom alpine climbing most appeals and like-minded members of the Sierra Club. To work more effectively toward this end, he had himself joined that Society,—

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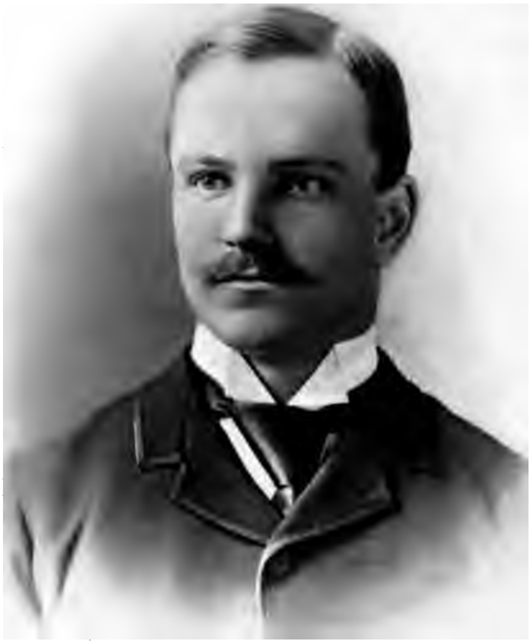
which mourns his loss with us, — and in a visit to San Francisco last May had consulted with some of its leaders as to the possibility of a greater concert of action between the two organizations. It was in view of what he believed APPALACHIA might accomplish in this direction that he, after much solicitation, had expressed a willingness shortly to place his experience in editorial work at the disposition of the Appalachian Mountain Club.

I gladly avail myself of permission to publish, in support of the above conclusion, the following paragraphs from a letter from Mr. Abbot's father, written after he had read advanced sheets of this article: —

" The love of the mountains had been with Philip almost a passion from early childhood. Wherever he was, he never lost an opportunity of ascending them. He had reached the extreme top of Popocatapetl in Mexico, and had spent nearly a month in ascending the peaks around Yosemite, before he was twenty years old. Afterwards he wandered over the mountains in Norway, and later spent two summers in Switzerland, in order, as he said, to study in the very university of mountaineering the scientific methods and experience of the masters of that art. His enjoyment of this form of manly athletic life was intense; his companions know what a joyous spirit filled his last day upon Mt. Lefroy. It was impossible for his parents in their sympathy with him to hold him back from this great delight. He used to say that all cares rolled away when he turned his face toward the mountains, from which, indeed, came his strength.

" Philip's mountaineering had grown from a delight into a steady purpose of exploration and study of our American Switzerland. These unexplored heights attracted him profoundly. He had learned to make reconnoissances after the methods of army engineers, to take barometric altitudes, to make maps and carry out geological research, and, in short, to spend his summers not only in recreation, but also in really useful scientific work. He had prepared himself for last summer's trip with the pains and skill of a thorough student, just as he entered upon it with the spirit of a brave man. He considered that mountaineering was the noblest form of athletic adventure which the opportunities of his day afforded.

" His mountaineering was not the mere recreation of an eager and venturesome boy; it was the expression of deliberate purpose by a mature and strong and able man to use all his powers of body and mind in exploring what he felt to be the finest things on earth. He entered upon this undertaking with much the same courage which led his uncle Stanley, after whom he was named, to leave college thirty-three years ago and fight for his country, and die in the field of battle, shot through the breast as he was leading his company, at a time when his classmates had not finished their junior year. He would be the last to be willing that any one should shrink from the secret dangers of mountaineering, as he would have been the last to fail to exercise the utmost caution which good sense and skill could dictate in encountering them. Such



PHILIP STANLEY ABBOT.
1890.

perils are common at all times and in all places. He would regret that anybody should draw from his own fate an inference against wise and cautious and skilful daring in the study and exploration of these noblest monuments of God's creation. And I may add that his father and mother, who shared his feelings, cannot even now regret that they did so, although the result takes so much joy out of their lives."

Philip Stanley Abbot.

By George Herbert Palmer.

Read October 21, 1896.

Any account of Mr. Abbot's work as a member of this Club would be unsatisfactory which did not include some personal record; for it was an unusual man who died on the peak of Mt. Lefroy. Fortunate as I was in knowing him for twenty-five years, I can perhaps cheer many who miss him by recalling to them anew the facts of his life and the impression of power and beauty which he so singularly gave.

Philip Stanley Abbot was born in Brookline, Mass., September 1, 1867, and was accordingly a month short of twenty-nine years old when he died. His first nine years were spent in Cambridge, the following nine in Milwaukee, his third nine again in Cambridge. During the last two years he once more had a home in Milwaukee, though business compelled frequent absence and much travel. He entered Harvard College in 1885, was interrupted by illness, and spent most of the next year in a journey to the West Indies, California, and Alaska. He graduated in 1890. Before entering college he had been twice in Europe, and was there twice again after graduation. Both in college and the Law School he led his class in scholarship, while he also managed the "Harvard Monthly" and the "Law Review," was Secretary of the Cambridge Civil Service Association, engaged eagerly in rowing and tennis, was much in society, and carried on regular charity work among the poor of Boston. Leaving the Law School in 1893, he entered at once the law-office of Warren & Brandeis in Boston. Here he had a year of general practice, and then began to devote himself to the legal affairs of the Wisconsin Central Railroad, with which he was connected at the time of his death.

So brief is the chronicle of his life; yet it was an abounding life, and fed from many sources. Every opportunity which poverty, riches, traditions, travel, or training can give, was his, and each opportunity he followed up as vigilantly as if he were the neediest of seekers. Into his shaping entered the divergent strengths of West and East. His father had been a teacher of Greek and Latin in Harvard College, so that when Philip was but a child the great voices of literature, ancient and modern, began their appeal. He knew the chief English poets before he could comprehend their meaning. He had read more Greek and Latin at entering college than all but a few have read at graduation. I well remember how in college days he would have about him a little copy of Homer, Sophocles, Horace, or Dante which he read in horse-cars with as great rapidity and pleasure as one ordinarily reads a French novel. French, German, and some Spanish were also at his command. He took high rank in History and Economics, even thinking at one time of devoting his life to the teaching of these subjects. Before he died two important professorships of law were offered him. But his interests were not confined to books; he was a wholesome and out-of-door person. Having a quick eye and easy access to the country, he learned in his first twelve years all that a boy can know about rocks, trees, and insects. His collection of moths and butterflies was large, and his enjoyment of his fluttering friends — as of every object and phase of nature — was always deep and intelligent. Later in life he enjoyed nothing so much as the visits to an ancestral New Hampshire farm, of which he undertook the management. To make the list of his accomplishments less incomplete, it should be added that he handled a boat well, was an unwearied walker, a forceful and luminous writer, a companion excellently gay or serious. Catching the ripple of his laugh, one felt that at any age the boy's heart would be in the judicious man. Of all who have gone forth from Harvard during the twenty-six years of my connection with it, none has more impressed me as the all-accomplished person, disciplined for leadership.

And he led in worthy directions; for his large endowments of mind and body were matched by an elevated character, a character simple in outline and in some respects old-fashioned, yet possessing a subtlety, sweetness, originality, and odd conjunction of seemingly opposed virtues which confound the describer. Remembering that winning face and sturdy form, and thinking of the high nature which shone through them, it is difficult to keep the just measure of praise. Dutiful he was, unsolicited by vagrant pleasures; public-minded, brave; considerately but pertinaciously truthful; ingenious in kindnesses; tender to the aged, the weak, the obtuse; swift of sympathy, a capital listener; dull at noticing slights to himself, unsuspicious, dispassionate in regard to his own mistakes; loyal, unstinting, having a veritable genius for friendship, sonship, brotherhood; forward in accepting responsibilities; cautious, forecasting, decisive; mannerly; abhorring cant and pretence; profoundly and continually religious, buoyant accordingly, and not distrustful of natural impulse; capable of outbursts of anger or of play; having the confidence of women; pure and clean, not for any squaring with decency but because dirt was repulsive; so regardful of the fair and fit that he made all whom he came near feel righteousness easy and best. He brought out the genuine and fragrant side of everybody, and everybody gave him back an admiring love. He took the love and was careless of the admiration.

Nor was his death out of accord with his life. It was rooted in his character. Perhaps it was through inheritance that he had always something chivalric and soldierly about him. The uncle for whom he was named left his Harvard studies and fell at Gettysburg. Another uncle was a distinguished general of engineers. Family habits accustomed him to large and venturesome undertakings, associated with public ends. Studious though he was, he was attracted by risk and rejoiced in daring wherever difficulties were to be found. In study, in business, or on the mountains, he was continually laying sagacious plans for battling with obstacles. Had fears or considerations of ease interested him, even without a fall from a precipice Philip Abbot would have ceased to be Philip Abbot. Lesser men may be mourned, for when they die they disappear. But his few years and gallant death, illuminated as they were by well doing and Christian hope, must always be to his friends a source of gladness.

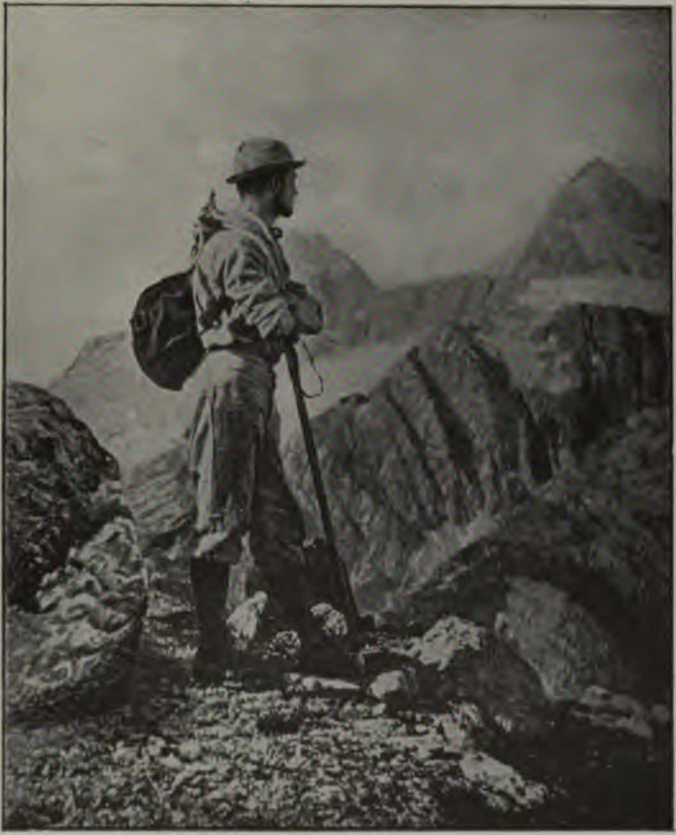
PHILIP STANLEY ABBOT.

MOUNT LEFROY, ALBERTA,

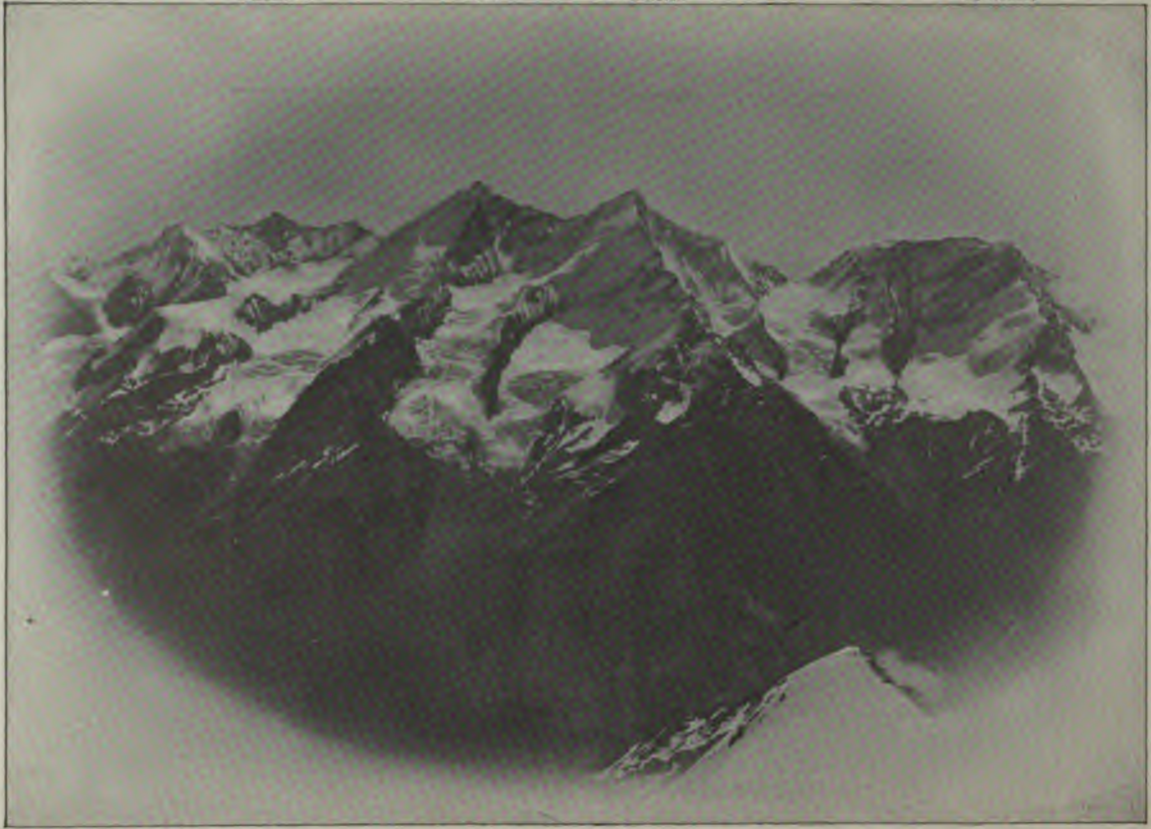
August 3, 1896.

WHAT bright, triumphant hopes, what noble joy,
For us who loved thy glorious promise, nor
Doubted what lofty ends thy life was for,
Were buried deep with thee, beloved boy!
High service of the High was thy employ —
Thou hadst enlisted in God's Holy War:
Thy banner's strange device, "Excelsior!"
Flamed on the crags of terrible Lefroy.
Climb still, O brave young mountain-lover, climb!
The clouds have hid thy track, but grander sights
Than meet our eyes on these dull flats of Time
Lure thy steps starward to eternal lights:
Still shines thy banner with its call sublime,
Still summons thy pure soul to holier heights.

F. E. A.



PHILIP S. ABBOT, ON GLACIER CREST.
AUGUST 12, 1895.
From a photograph by Parker B. Field.



THE NADELGRAT AND THE MISCHABELHÖRNER

From a photograph by Vittorio Sella.

Ascents near Saas.

BY EDWIN SWIFT BALCH.

Read February 10, 1896.

THE Saas Valley is one of the most attractive in the whole range of the Alps. Its southern portion is almost parallel to and due east of the Zermatt valley, into which it merges in the north at Stalden. It is long and narrow, the exit to Macugnaga in Italy being over the oldest pass in the Pennine chain, the Monte Moro, which has been in use for centuries. To the east of the Saas valley, between Saas and Simplon, lies a chain of splendid peaks: the Portienhorn, the Weissmies, the Laquinhorn, and the Rossbodenhorn. To the west, between Saas and Zermatt, rises a chain of still grander summits: the Allalin and the Alphubel, the range of the Mischabel with the Täschhorn and the Dom, and the Nadelgrat, with its culminating point, the Nadelhorn.

The hotel at Saas Fee is placed in one of the most magnificent situations in Switzerland, with a view on the Portienhorn in one direction, and on the Fee Glacier and the cirque of the Mischabel on the other. It is rather remarkable how few Americans find their way to Saas as yet, when all the numberless splendid mountain excursions and walks in the neighborhood are taken into account. The beauties of the Saas valley, however, are still overshadowed by those of its more celebrated neighbor, the Zermatt valley.

The names of the Saas peaks record a little known historical event, namely, the presence of Saracens in the Alps. A robber band, setting out from Spain, gained possession of the small town of Fraxinetum in Provence in the year 888, and from then until the year 975 harried Subalpine Gaul, Burgundy, and the North of Italy. They held the passes of the Mont Cenis and the Grand Saint-Bernard, and pushed as far as the Engadine, leaving their record there in the name Pontresina, "Ponte Sarraceno or Ponte Zarisino." Almost all the authorities — Messrs. Engelhardt, Keller, Wethered, Coolidge, Dr. Dübi, and the Arabic professors at Oxford — are agreed on the Arabic origin of the names of the Saas mountains. Allalin ("A-la-lain," "very lofty of the fount"); Alphubel ("Al-fu-abl," "a thousand blocks"); Mischabel ("Misch dschib," "the triple-peaked mountain" or "Mawi schibel," "a region haunted by wild animals"); Monte Moro ("the mountain of the Moors"), — these are some specimens of supposed derivations; and when we consider the great number of such names, there can be little doubt of the correctness of the theory.

In the spring of 1882, an article by Mr. W. M. Conway appeared in the Alpine Journal giving an account of the Nadelgrat, and stating that there was only one recorded ascent of the highest summit, made by some of the natives of Saas in 1858. It was a pleasant surprise to find that one of the great summits of Switzerland had not felt the tread of the foot of any member of the Alpine Club, and in planning a tour for the summer the Nadelhorn became the magnetic point of attraction.

I thought it would be best to secure a guide from the neighborhood, and after a correspondence with the great local celebrity, Alexander Burgener, engaged him for a couple of weeks. On arriving at Viesch in the Rhone valley, where we agreed to meet, I was disappointed to find that Alexander had sent a message by his brother Franz to say that he was laid up with a sprained ankle, which supposed injury I afterwards found out to mean that he had another engagement with Dr. Güssfeldt. However, as Franz was almost as celebrated a guide as Alexander I took him instead, and he proved a skilful and daring climber and a fine mountaineer, but inaccurate in some of his statements; assuring me that all our ascents were quite new, and also being decidedly at sea about the names of the peaks. He had brought as second guide another Saas man, Aloïs Anthamatten.

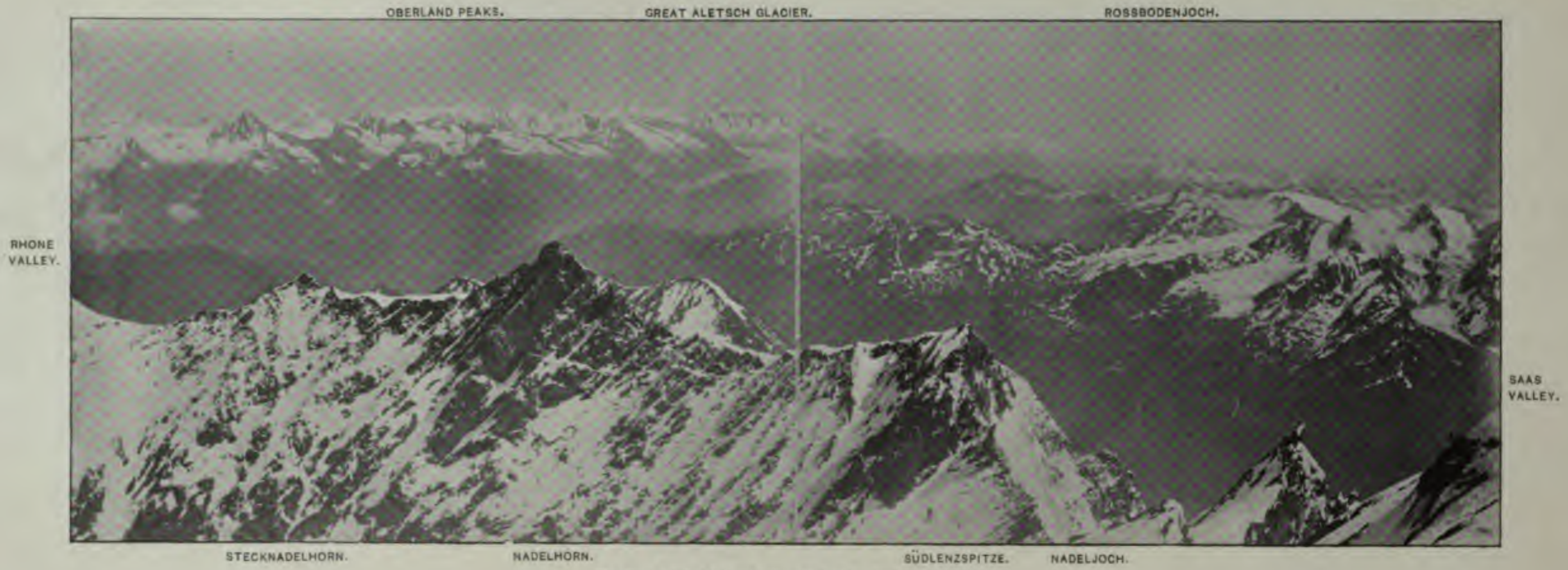
I had intended to begin with an ascent of the Jungfrau, but the preceding week had been rainy, and the guides said, "We cannot do the Jungfrau; we fear avalanches." Quite agreeing with this, I suggested crossing the Fletschhorn range somewhere; so, the guides evidently thinking it the best move after the bad weather, we trudged over the Simplon as far as Simplon village, lunching *en route* at the Hospice which was founded by Napoleon and in which the brothers are bound to give every traveller hospitality. It was very pleasant. They gave me an excellent *déjeuner*, and Frère Maurice sat with me and entertained me by telling me all about the institution. I spent the next day at Simplon, where the little hotel was excellent, strolling around in my slippers, and trying to see the mountains, which remained provokingly and persistently covered with clouds.

On the 22d of June we rose at one o'clock and were off in the dark by two o'clock, *en route* for a col which Burgener said he was quite sure had never been traversed, but which proved to be only a variation of the Rossbodenjoch. We crossed meadows and went through pine woods for some time, and over grassy alps and moraines, until we reached the foot of the ridge at about five o'clock. There we had breakfast, when I tasted something new to me, — butter and honey mixed, — and very good it is. From a neighboring ridge five chamois watched us intently during our meal.

After breakfast we started on our ascent. There was a big couloir; but the guides declined it, as the snow was in bad order, and turned to some stiff rocks in preference. At the top of the rocks we struck a snow slope with more steep rocks above. The state of the snow bothered us a great deal, and little avalanches were perpetually tumbling down during the ascent. Going up the snow, soft, wet, and steep, was not easy, but getting on and off the upper set of rocks was much harder. There was a kind of cleft or chimney some distance to the left which seemed the only possible way up the rocks, as they were about perpendicular and the take-off was the mushy snow slope. However, the guides appeared to think it all right; so I concluded that inexperience made that seem dangerous which was not so. I believe most amateurs feel in the same way at first. When snow is placed at a very sharp angle, you cannot realize that it will not slide and take you along with it. Burgener got utterly stuck in the rocks; so Anthamatten went up and stood under him, and Burgener stood on his shoulders and climbed up with his help, and then dragged us after him with the rope by sheer muscle.

Then we got on well enough for a while — principally on my knees as far as I was concerned — until the rocks overhung. We sat on a little bit of a ledge. A narrow and exceedingly steep couloir came down beside us, and must be crossed. It broke off about twenty feet farther down, and curled off into empty space. Anthamatten went to work and cut a sort of ledge right across to the other side, Burgener and I hanging on to the rope and to the rocks. When Anthamatten had crossed safely, it was my turn. I had one end of the rope around my waist, Anthamatten holding the other end from the opposite side of the couloir. Burgener then let me down on to the snow by my coat collar, and I started on my adventures. I rammed my left hand into the snow until the fingers felt ready to drop off. I dug my axe in with my right hand, and went on, step by step, "slowly, very slowly," until the other side was reached. Then we flung the end of the rope back to Burgener, and held on hard while he crossed. After the successful passage of this exceedingly *mauvais pas*, we had another terrifically steep, nasty, and wet snow slope. While taking breath, I said to Burgener, "How can you always tell about the snow being safe?" and he replied: "If I could not, I should have died at least two hundred times already." When we had breasted the snow slope, we were on the col, and had only to take in the magnificent panorama of the Rossbodenhorn directly above us, the Mischabel range on one side and the Lepontine Alps on the other. Then, after a third breakfast, we strolled down to Saas over an easy glacier and moraines and lovely alps, where we luxuriated on fresh milk.

On June 26th, Burgener led me up on to what proved to be the second ascent, although he assured me at the time that it was new, of a sharp little peak, the Portienhorn or Pizzo d'Andolla. We rose at midnight, and were off at half-past one o'clock. One feels intensely foolish in getting up at



THE NADELGRAT FROM THE DOM.

From a photograph by Vittorio Sella.

this hour. We pounded up through darkness until sunrise, when the Mischabel opposite lighted all up in a shining immensity of golden rose. At six o'clock we had passed the chalets of the Almagell alp, and stood on the glacier streaming down from the side of our peak. Then we faced the rocks of the southern arête, and went to work. The Portienhorn is 3,644 meters in height, and from the time we struck the rocks until we were fairly off our last snow slope we were just eight hours. We went up the southern and down the northern arête; and they were both jagged, broken, and difficult. We travelled generally one at a time, the other two holding on to the rope and being supposed to be *ganz fest*, — or *fehst*, as they pronounce it in the Valais. In places we could just get along the top, sometimes on hands and knees or sitting down; and there was one place where, as there was no footing, we actually progressed by lying flat, with our feet hanging towards Switzerland, and with our hands grasping the edge of the overhanging rocks, down which a stone would have dropped more than a hundred feet without touching anything. Still there was no danger, for the rocks always afforded handhold; and as long as there is that and the rocks are sound, any one not troubled with vertigo should be safe. Some of the rock teeth were connected by delightful little knife-edge snow arêtes, just wide enough to be crushed by the boot, but which by slightly bending forward could be traversed in safety. The summit of the mountain was a great block of stone propped up on another one, both overhanging the Italian side. We curled round under them, and sat on top in a state of great delight.

But the clouds had been slowly gathering for a storm. So, at about half-past twelve, after ten minutes on the summit, having built a little stone man and deposited a bottle with our names in it, we moved down the narrow northern arête. One or two places were on the verge of being dangerous. We came to a smooth, level granite slab set at an angle of perhaps thirty-five degrees, down which we must go. There was some snow and a few broken rocks at the bottom. Anthamatten slid down, got some kind of hold in the snow, and then Burgener lowered me down to a rock where there was footing. As soon as I left the ledge beside Burgener, I became a helpless bundle, for there was nothing even to put a finger into. Yet when Anthamatten and I were securely placed, Burgener turned round, faced the slope, and descended without even a sign of a slip. But how, is a mystery. Then we came to a difficult gap with a stiff little snow slope leading into it; and of course I slipped, and sent down a small avalanche to Italy, and should have gone there myself had it not been for the climber's safeguard, the ever-blessed English rope.

The rocks of the arête terminated in a long snow slope, and when within about fifty feet of this, the bad weather caught us in a tremendous snow storm. We had heard two or three reports of thunder, when my axe went suddenly "whi-ze — whi-ze." If possible, the wisest course in such circumstances is to throw away the axes and run. But we dared not throw our axes away, the rocks were too icy; so we held on to the axes, and did the best running possible. "Schnell!" said Burgener, and we climbed down the rocks and glissaded down the snow as fast as we could go. The guides and I all admitted having been thoroughly scared. Our long slide took us to the bottom of the snow slope, where we had some lunch, after which we returned to the hotel, reaching it just sixteen hours after leaving.

Two days later we started for the Nadelhorn. A porter was added to the party to help carry firewood and blankets, as the ascent seemed too long for one day, and it was therefore necessary to bivouac somewhere on the mountain. We started out about two o'clock in the afternoon, and slowly toiled first up the lower slopes of the Mischabel, and then up the great buttress which forms the northern boundary of the cirque of the Fee Glacier; the guides, as we went along, picking up bits of dead rhododendron bushes for the fire. At about six o'clock we came to a small, fairly level place, where a little stream trickled down. Here we stopped, lighted a fire, and made a kind of soup with some rye flour, and boiled some tea. There was cold mutton for me; but I had the curiosity to taste the guide's provisions, *bockfleisch* and *schnapps*. How the taste is brought out I am not able to state; but the meat has the exact flavor of a tallow candle, and the *schnapps* is one of those utterly impossible drinks — like the Norwegian *aquavit* or the Southern corn whiskey, — that primitive man seems to evolve in all climes, and that a civilized palate absolutely refuses to touch twice.

After supper we rolled ourselves up in our blankets and lay down. The guides slept soundly; I could not. It was a lovely moonlight night, and the great Fee Glacier was spread out below, with its parent snows of the Dom, the Täschhorn, the Alphubel, and the Allalin rising up in weird whiteness above. It was awfully cold, and the rocks were very hard through one blanket. The truth of the matter was that we were not properly provided with wraps, as one of Dr. Jaeger's sleeping-bags or an eiderdown quilt is a necessity when you are above snow-line. Moreover, tea is about the worst possible nightcap.

About three o'clock we rose, and after a sketchy meal started at four o'clock. First we toiled up to the summit of our buttress, a long broken rock backbone; then we crossed a little snow-covered glacier streaming down from the Nadelhorn, and breasted gentle snow slopes to the saddle between the Ulrichshorn and the Nadelhorn. This was the lowest point of the long arête leading to the summit of the latter. Here, on a little rock jutting out of the snow, I sat down and had a short nap. Then we pushed up the arête. It was never difficult, but only long and hard on the wind. Sometimes there were beds of rock, but mostly there was hard frozen snow which needed steady step-cutting, and which occasionally curled over into a cornice only to be walked alongside of with the greatest caution. It was a hot day, and my thirst seemed unquenchable; so every now and then I made a snowball and put three or four drops of brandy on it, and found this a great relief. To reach the top we had to pass through the eye of the needle, the little gap that has given its name to the peak. At two o'clock we sat on the top, 4,334 meters up, and ate our lunch and took in the view, which, however, was rather disappointing, as clouds or mists had covered many of the peaks. The long arête leading from the Nadelhorn to the Südlenzspitze was the most impressive feature, from its exceeding sharpness.

Then we built a little stone man on what seemed an untrodden summit, as there was no sign of any previous visitation by man, and, the mists growing thicker around us, turned and retraced our steps down the arête and across the glacier to the buttress we had ascended in the morning. Here Burgener thought he would improve on the route of our ascent, and took us into a snow couloir which was pitched at so steep an angle and seemed so unsafe that I absolutely refused to go down it; so we returned to the buttress, which we descended, getting clear of the rocks just at nightfall.

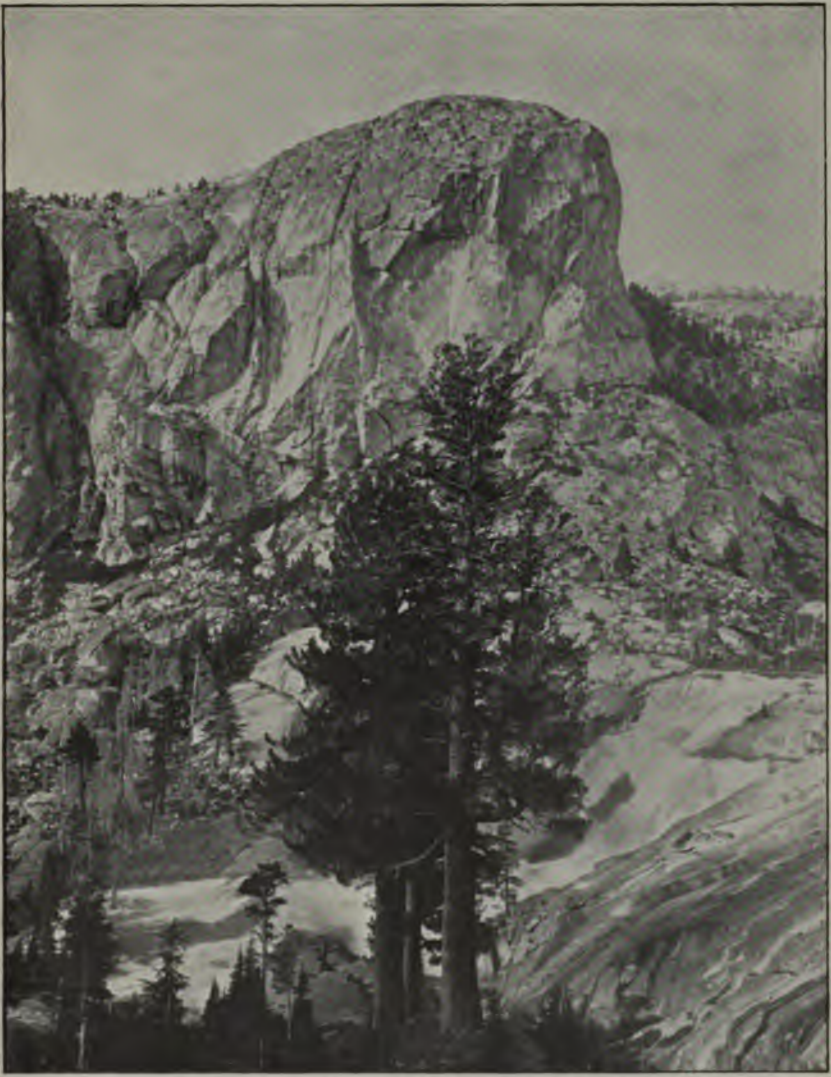
The Grand Cañon of the Tuolumne.

By Theodore S. Solomons.

Read January 13, 1896.

In the High Sierra of California, fifteen miles north of Yosemite Valley, the Tuolumne River, after gushing from its parent fountains of ice and snow, swims through beautiful glacial valleys, and then enters a narrow, deep, and winding gorge, twenty-five miles in length, whose lower termination is the Hetch-Hetchy Valley, — a perfect miniature of the Yosemite. Below Hetch-Hetchy, the Tuolumne's trench is similar to that of other Sierra streams, and has, therefore, no special interest. The gorge itself is known as the Grand Cañon of the Tuolumne; and grand it is, beyond the genius of language to express.

Lying thus in such close proximity to the famous Valley, and connecting two such well-known and oft-visited localities as Hetch-Hetchy and the Tuolumne Meadows, it may seem strange that this wonderful gorge has remained unknown to the travelling public. Yet such is the fact. Until the summer of 1894 those who, so far as is known, had travelled it from end to end could be counted on the fingers of one hand; and previous to that summer it may be doubted



ACROSS THE TUOLUMNE CAÑON FROM THE SOUTH SIDE.

From a photograph by Theodore S. Solomons

whether any human being had made the trip for a period of twenty years. While thousands upon thousands have witnessed the wonders of Yosemite, this locality, of quite equal if not greater scenic attractiveness, has remained a *terra incognita.* The reason is to be found in the exceptional roughness of the descent, to comprehend which the imagination rather than the experience of even the mountaineer must be appealed to. Once fairly in its depths, the traveller has nothing to do but struggle on to the end or beat an ignominious retreat; and this is likely to be still more difficult. To climb the side walls of perpendicular granite would be out of the question; and as the trip requires several days, no matter how athletic he may be, the visitor must carry food and utensils on his back, and he must sleep without covering, warming himself as best he can by his camp-fire. Hence it will not be doubted that the Tuolumne Cañon remains in no immediate danger of being overrun by tourists of the kind that daub both their given and their Christian names upon the face of inoffensive Nature.

Late in the sixties the State Geological Survey, through Mr. Clarence King, took a peep into the gorge at its upper end, — scarcely more than a peep, indeed, for the experienced author of "Mountaineering in the Sierra Nevada" reported to Professor Whitney, his chief, that he met an insuperable obstacle in the shape of a precipice, and that the cañon was probably inaccessible throughout its entire length. At that time no one could be found who had ever heard of any mountaineer having made the descent. The first person to travel through the cañon was, according to popular report, the Sierra explorer and botanist, John Muir, who made the journey some time during the early seventies. Subsequently he twice took small parties through it. Mr. J. M. Hutchings, the venerable resident of Yosemite, also tells of having pushed down the gorge to its very end. With these exceptions, none have taken the trip, so far as is known to the residents of the Yosemite Valley, from which place alone the cañon is conveniently accessible. Prospectors, sheepherders, or nondescript adventurous persons may have done so, but it is not likely. In the summer of 1892 two students of the University of California woke the echoes in the grand old gorge, and two summers later five young mountaineers "blazed" the way here and there, on behalf of the Sierra Club. The writer and his companion followed the last-mentioned party a few weeks later, in the middle of August.

Before entering on the brief description I shall offer of the Tuolumne Cañon itself, it will not be amiss, I think, to explain its location and surroundings, and especially its relation to Yosemite; and later to institute a brief comparison between the two localities.

Mt. Lyell, a little over 13,000 feet in altitude, is the common parent of four large rivers, — Rush Creek, the main source of supply of Mono Lake, lying on the eastern side of the Sierra Nevada, the San Joaquin, which runs south, the Merced, and the Tuolumne. The Merced rises on the southwestern slopes of the mountain, and curves west, receiving many branches and flowing in a comparatively shallow, trough-like cañon, through a bare granite basin, to the Yosemite, twenty miles distant. The Tuolumne, which carries nearly twice as much water as the Merced, rises on the northern side of Mt. Lyell, flows for some distance parallel to the crest, and then turns west for several miles, when, at a distance of about ten miles from the crest, it plunges into its gorge, from which it does not emerge until, nearly twenty-five miles below, it enters the spacious Hetch-Hetchy, which is often called the Yosemite of the Tuolumne River. On leaving Mt. Lyell the Merced immediately traverses a sea of desolate granite. The Tuolumne, on the other hand, before passing into its marvellous cañon, meanders through meadows enamelling the fairest of alpine valleys between superb peaks and domes. Just why this difference, it may be interesting at another time to inquire. For the present, however, we must concern ourselves with the conditions as we now find them.

Away back in ante-glacial days, the rudiments, so to speak, of both channels were eroded, and it only wanted such an agent as ice, in sufficient depth, and propelled by adequate force, to deepen them, and otherwise to give them substantially the appearance that they present to-day, except for the vegetation, the growth of which awaited the accumulation of a rich granitic soil and a warmer climate. To the student of historic geology, no portion of the Sierra is more interesting than the region of the Tuolumne Cañon. Of the many great glaciers which covered the crest of the Middle Sierra during the later centuries of the Ice Age, that of the Tuolumne was by far the largest, deepest, and longest. Starting from Mt. Lyell, where its shrunken remains still exist, a glacier in every essential respect, it spread out through the Tuolumne Meadows, receiving reinforcements from the east and north, when, as a mass of ice nearly a half-mile high, in the zenith of its might, it reached the edge of the level and plunged over the brink of the long depression which is now the Grand Cañon of the Tuolumne. By its constant and mighty friction every hollow was symmetrically rounded, every angle blunted, every point broken, and the walls planed, smoothed, and polished so that even now they shine like burnished marble. Simultaneously with the polishing and scouring above, the under side of the glacier — which had now grown trebly powerful from its compression into so narrow a channel — was grinding and tearing and ripping up the layers of the solid granite floor, digging deeper and deeper the trench, and gradually excavating those precipice depths. Everywhere the story of the ice is written in dramatic characters, from the dark pinnacles of Dana and Lyell to the heights above the Hetch-Hetchy Valley. To-day the theatre is almost deserted of its ancient actors. A puny river, and in winter the frosts that crack apart the bedded granite, are all that remain of the titanic forces of erosion; and man, if he will, may come and marvel. No sound, except that of the falling water, will disturb his contemplations, and no hindrances but those the true mountaineer delights to conquer will check his conquest of the entire wonderland.

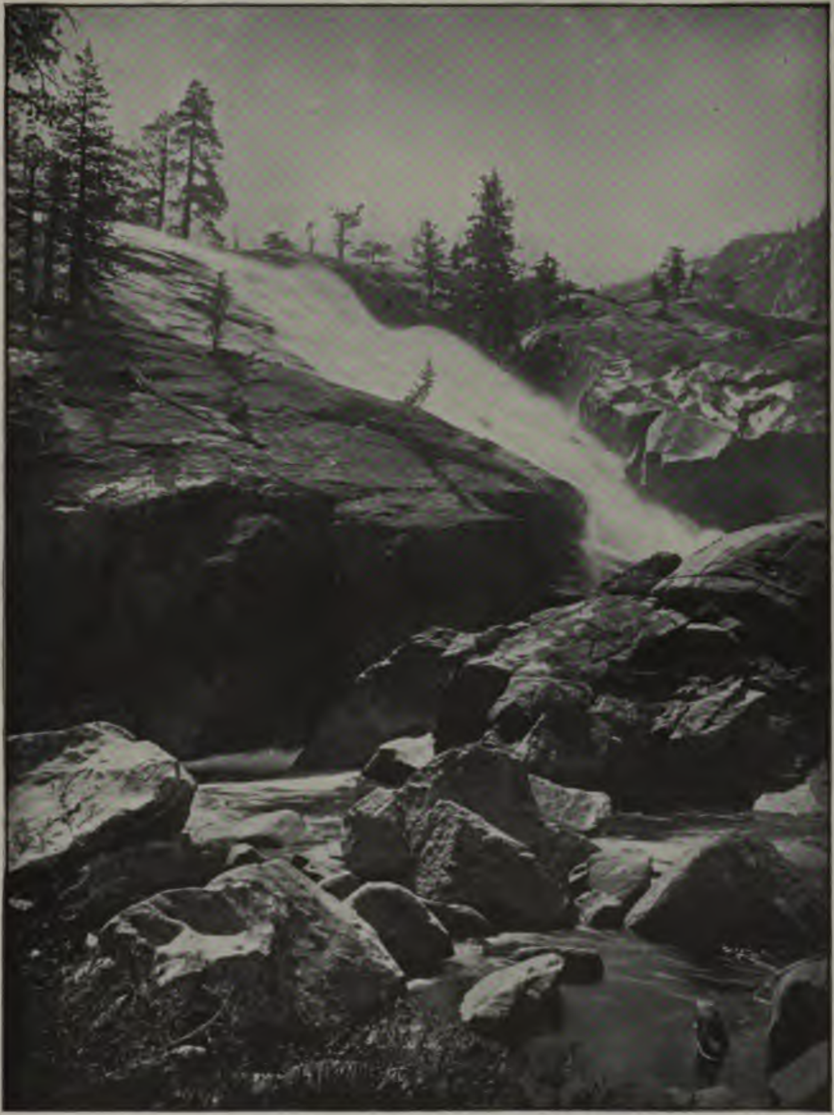
Starting from the Yosemite Valley, with burros packed with our outfit, we travelled by trail and wagon road — the only one over the Southern Sierra, by the way — to the Tuolumne Meadows, which we reached in a day and a half.

The region is here one great pleasure-garden, set among alpine peaks and domes and ridges, which offer the most striking contrasts in their sternness and general aspect of desolation to the beauty of the meadow, groves, and flower-margined lakelets that nestle in their bosom. The Big Tuolumne Meadows are about fifteen miles in length, if the southern arm which reaches back to the base of Mt. Lyell be counted. The grass, which once was eaten to the roots by flocks of sheep, has grown up again in all its original luxuriance since the patrolling of the Yosemite National Park by the military. Mt. Dana, Mt. Gibbs, Mt. Lyell, Mt. Conness on the main crest, and Cathedral and Unicorn Peaks, Mt. Hoffman and others on lateral spurs, Fairview Dome, Lembert's Dome, Tenaya Peak, and a host of unnamed pinnacles and domes might engage the photographer or the climber for weeks. Crossing the river to the north side, we soon reached the lower end of the meadows, and walked over several miles of bare granite to Round Meadow, where a last and most superb view of Fairview Dome and the peaks above it was tinted by the alpine glow, as we ate our supper and lay down in blankets for the last time for at least a week. A little below Round Meadow the head of the cañon is reached. Hobbling our animals in a little grassy flat securely enclosed by granite walls, we packed our stout knapsacks and started in high spirits. Our outfit was a carefully selected one. The fewest and lightest cooking-utensils and about thirty pounds of nutritious food made up the contents of my companion's pack; and mine, which was secured in a specially constructed camera case, consisted of a 6½ × 8½ camera, thirty-five glass plates, twelve plate-holders, tripod, rubber blanket for changing plates, socks, handkerchiefs, rattlesnake antidotes, et cetera, the whole weighing exactly thirty-eight pounds.

We had no sooner surmounted the first bluff along the river bank than we were surprised by a series of beautiful rapids. In briefly describing the cañon, John Muir has said that "for miles the river seems to have no definite channel." The remark immediately recurred to us as we gazed on the river. The dam of some reservoir in the vicinity might have burst and precipitated the flood upon the granite below, for all that it resembled a river bed. The surface that the torrent was utilizing as a race-course was a steeply inclined, flattish-bottomed gully of bedded granite, laid in irregular, plate-like steps. Here it was "bouldery;" there it lay in smooth glacier-polished tables and basins; again it was massed in irregular bosses that supported a stunted but hardy growth of tamarack and juniper trees. Down the trough the river flung itself in the wildest abandon. While the irregularities of the granite were small, the river was merely a frothing rapid. Where the bottom lay smooth and even it was a beautiful green and "silver apron," like the sheet of water so named above the Vernal Fall. Where the bottom was formed of a series of pitches, the stream became a series of foaming cataracts; and where it changed to precipices, there the river flung itself over in sheer falls, the while roaring in lion-like boastfulness of its temerity.

Walls now begin to appear on either side of the river in the form of a succession of elevated masses of granite. Two of these bluffs on the north side and three on the south, — to which the name "Three Brothers" will probably eventually be given by some original person, — are especially commanding. They mark the beginning of what is soon to form one of the most stupendous gorge-walls on the globe. The lower of the two bluffs on the north wall, which for the present we have called the Tuolumne El Capitan, is by far the loftiest and most striking of the five. Its height is tremendous, its front absolutely perpendicular, and its color, vertical striping, and other markings so similar to those of El Capitan and the cliffs generally of the north wall of Yosemite, that no one could doubt that the same forces are responsible for the scenery of both localities. The summit of the rock must be between two and three thousand feet above the river, yet its entire surface is finely glaciated.

The wealth of water forms, however, principally engages the attention in this portion of the cañon. At the base of each declivity down which we worked with great labor and caution, a new fall or cascade would dazzle us with its beauty; and these grew more and more splendid as the river gathered volume from the several entering streams. Of this almost uninterrupted series of falls, cascades, rapids, and cataracts, — a series which extends in a continuous chain for six or seven miles, — only a few bear names, and these are such as are accessible to those who take a day or half a day's ramble down the cañon. A few miles below the meadows there is an Upper and a Lower Virginia Cascade. Just before reaching a trail that crosses the cañon, the Tuolumne Fall is encountered, — a small affair, as compared with the lower falls; and at the end of a little forested valley, through which for the first time since leaving Round Meadow the river swims placidly, are the White Cascades, where, after dividing into a number of streams, the river spreads itself out and courses down the rock in a number of foamy fans, through which the burnished plates of granite show like satin behind flowing gauze. From the White Cascades, which are the last that have received names, to the final group near Return Creek, it would be safe to say that there are twenty series of falls, cascades, and rapids. In some places we stood on a boulder's edge, and looked up a quarter of a mile of continuous cascade. The final group are the California and the Le Conte Cascades. The former spread themselves out over the sloping granite floor of the cañon, as though to display their dazzling surfaces to the caresses of the sun. The floor here is wide, the ledge over which the cascade tumbles quite level and even. The slope itself is an inclined plane divided into irregular steps, producing in a general view the effect of an immensely broad, low staircase of some great building. A few stunted tamarack and juniper grow here and there in the channel and between the ribbons of water. Leaving these cascades with a sigh of regret, we followed the river to the end of the level space below, to a kind of parapet, over which we leaned and saw the river, now united in a single channel, go hurtling in great leaps down a perilously steep precipice. Climbing over the parapet and following down the lines of disintegration in the granite, occasionally getting some assistance from a little soil, a shrub, or stunted tree, we advanced again to the river, and found ourselves

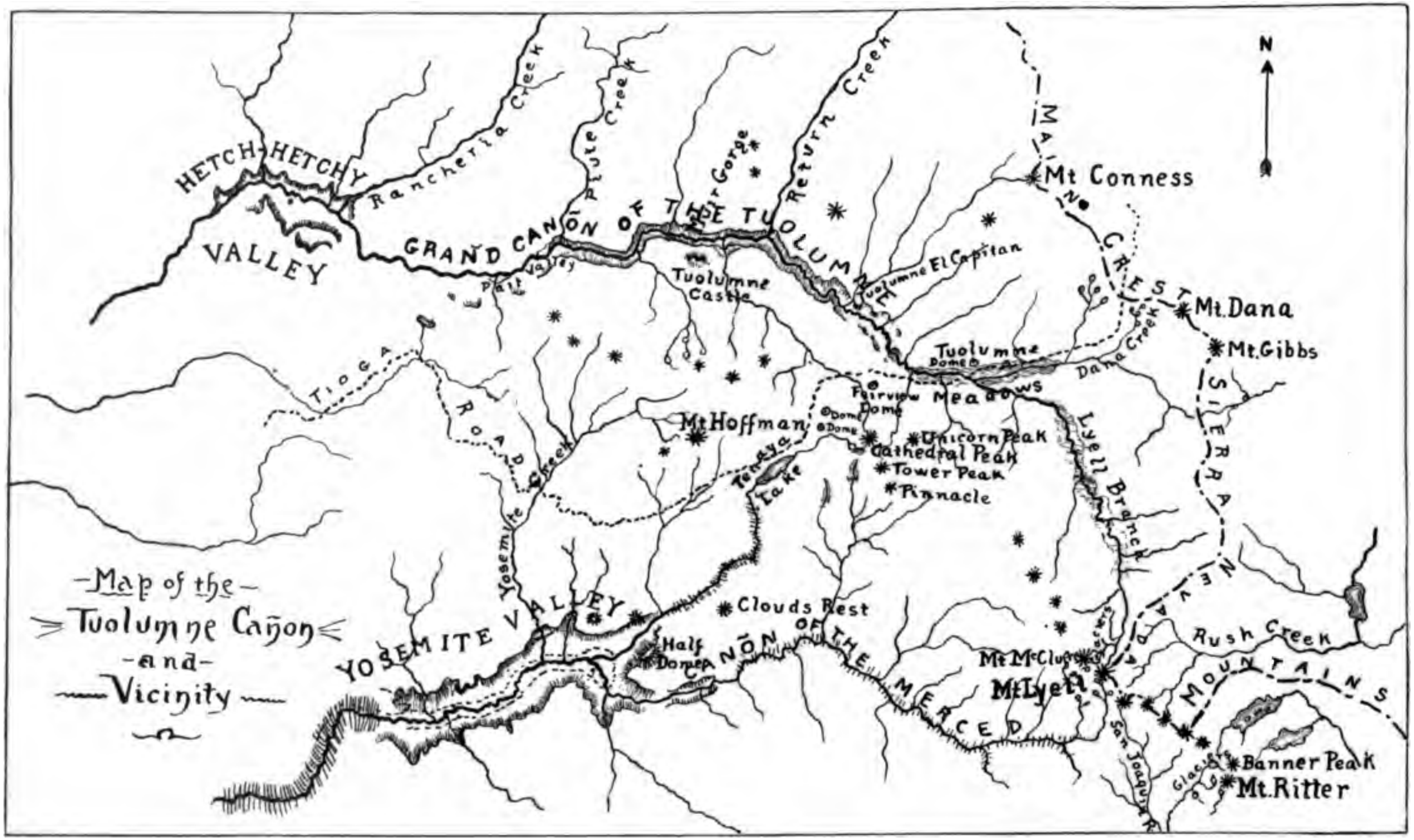


THE LECONTE CASCADES.
From a photograph by Theodore S. Solomons.

opposite the centre of the cascade. With the exception of the leaps which we had seen from above, the cascade moved down the granite which was steep and uniform, with a sliding or sweeping motion, majestically and silently almost, falling at length into a green pool. The length of this chute or inclined plane seemed about 700 feet, its angle about 45° or 50°. The leaping water at the upper part we recognized as forming the "water whirls," — a term applied descriptively by John Muir many years ago, in an article on the scenery of the Yosemite country. Two protruding ledges have evidently been formed, against which the swiftly gliding water precipitates itself only to be thrown into the air a distance of perhaps twenty feet, thus forming two great discs or wheels. By what odd freak of erosion or fracture this ledge was formed it is not easy to conjecture.

At Return Creek, a large tributary which enters from the north, the cascades practically ceased, the total descent from the meadows, which are nearly 9,000 feet in altitude, having been something over 3,000 feet in about six miles. But, as if to mollify us, the cañon walls continued to rise in ever-increasing height and perpendicularity, and gradually, instead of looking down at the kaleidoscopic changes of the river, we found ourselves looking to the right, to the left and above with growing awe and wonder. Yet the words "awe" and "wonder" hardly express the traveller's sensation. Considering its tremendous height and comparative narrowness, the cañon was practically a cleft, but a cleft of such magnitude as to oppress us with a sense of our utter smallness, hopelessness, and dependence on mother earth, between whose mighty ribs, as it were, we were crawling, ever crawling, yet appearing to make no progress. Never before had we felt ourselves so really *in* the earth and a part of it. I think that the Tuolumne Cañon is peculiarly calculated to awaken emotions of this sort, — emotions which, in our cases at least, no other environment had ever previously developed.

On the north wall there was visible the apparent hardness, the yellow and cream-colored granite, and the dark, perpendicular striping of El Capitan and the cliff over which the



-Map of the-
Tuolumne Cañon
-and-
Vicinity

our waists for a quarter of a mile to avoid the fearful roughness of the banks.

Among the innumerable unnamed beauties of the cañon are twin falls, not on the river, but plunging over the south wall,—at this point higher, perhaps, than anywhere else. The stream is a large one, fed by the snows in the vicinity of Mt. Hoffman; and in early summer, when the volume of water is greatest, the falls must be nearly as fine as the lower Yosemite Fall.

Half-way down the cañon, and about a mile below the Twin Falls, we saw a great double-peaked rock just back of the south wall, which has been named the Tuolumne Castle, and which is so tremendously lofty when viewed from the depths of the cañon as seemingly to pierce the very sky. A contour map of the United States Geological Survey — as yet unengraved, but from the original drawing of which I have a photographic copy — places the height of this rock at between five and six thousand feet.

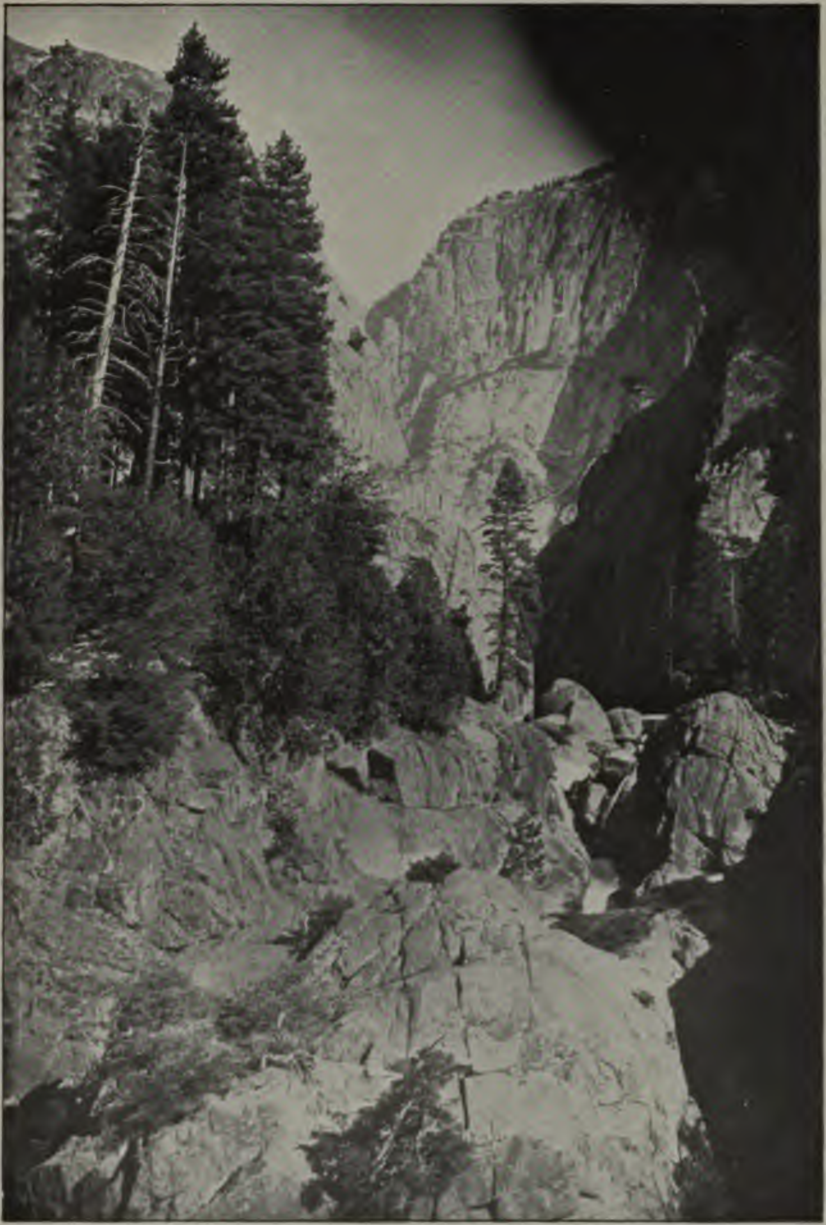
But the final act, the consummation of this drama of ages gone by, was the carving of a gorge within the gorge, so deep, so narrow, and heralded by so terrific a roar that the now tired traveller instinctively guesses that he is nearing the end of the wonderland. The locality of the Muir Gorge is a mile or two beyond the Tuolumne Castle. Here the cañon widens; but a high spur about half a mile wide runs across it, and through this spur, where it abuts upon the base of the south wall, the river has torn a channel, a cleft, the most awful place — I use the word advisedly — I have ever seen. We stood on a giant boulder, on which, as we afterwards found, the previous party had also stood, while the seething waters hissed madly by, and gazed with proudest feeling into a very hell of granite. Up from the snarled white thread of river two smooth, bare walls rise nearly side by side; so near together, indeed, that there is scarcely space enough for the river to flow between. There is not, in fact, space enough, and the depth of the stream is in places far greater than its width. Forced thus into a narrow prison, the great river roars and struggles and foams, and in its madness to be free hurls itself forward in the throat of the gorge with a speed that nearly dazes the traveller who may have crawled slowly and cautiously to the brink. There is something peculiarly saturnine in the look of the Muir Gorge, a threat in the diabolical frown of its walls, a fierceness and cruelty in its gleaming depths; and the dreadful roar that comes up from the abyss suggests a pandemonium of warring beasts.

Leaving the gorge, we climbed back to the higher part of the spur, made our way to the cañon below, and back again to the mouth of the gorge. The south wall in the vicinity of the gorge is nearly perpendicular, and, as we calculated at the time, about 3,000 feet high. This the residents of Yosemite refused to credit; but I notice by reference to the contour map that that wall is between four and five thousand feet high. In a photograph the conifers on its summit are almost inappreciable to the unaided eye. At the gorge's mouth the river falls in short descents among caverns formed by piled-up earthquake boulders of immense size. The picture presented in this gorge mouth, formed by the distant cañon, is something utterly indescribable. Below the Muir Gorge the scenery of the cañon is hardly less magnificent than above it, but the traveller is not to blame if he hastens on; for the floor is now a little less rough, there are frequent respites of grove-covered flats, and with the image of the Muir Gorge still in his mind, he is apt to be a little neglectful of the scenery that follows. At least it was so with us, but in our case there was the additional incentive to haste of a nearly vanished larder. Some inexplicable mystery of miscalculation, — for we should have had enough to last us a week, — or an unparalleled velocity of appetite must have caused this. At all events, on the fifth day from the Meadows, we ate our last crumb in Pait Valley, and prepared to scale the wall, strike the Tioga road, and hasten to the Yosemite. Pait Valley is four or five miles below the gorge. It contains several little meadows, garden spots, and groves, and a large stream comes in from the northeast, breaking at last the continuity of the north wall. We were now in a V-shaped cañon, which obviously accounted for our sudden determination to scale the wall, whose sloping sides average four thousand feet in height, though occasionally rising to five thousand. Supperless, we camped that night near the summit of the wall by a little torrent. Our bed sloped toward the Tuolumne River, at such a comfortable angle as about 60°. Breakfasting the next morning on water and fresh air, we urged our jaded limbs to climb the final crags, got over into a beautiful fir forest, and at noon reached the Tioga road, near which at a certain spot I had had the forethought to secrete the end of a loaf of bread in a hollow tree, not thinking we should ever want it, but hating to throw it away. We did not find the bread too stale to eat. The following afternoon we reached the top of the Yósemite Fall, where I sat down at a picnic table to mend my overalls, while my now humbled companion sought among some recently abandoned cans until he found one in the bottom of which there still remained some greasy morsels of corned beef. He was only twenty, and his lusty young vitals craved with a craving that was no respecter of finical conventionalities. Some stylish English tourists mounted on burros heaving in sight at this moment, I took to brush for decency's sake, and my friend hid the corned-beef can behind his back and his blushes as best he could. Two hours later, in the Yosemite, — that haven of food and of rest, — we turned ourselves loose on all kinds of edibles, and "lied" — as the natives vowed — about the Grand Cañon of the Tuolumne, in the happy leisure that followed. New shoes had ripped, stout overalls were in shreds, shirts were torn, and our finger tips worn to the quick from the incessant laying hold of the rocks. Of twenty miles of cañon descent, I doubt that we had been able to *walk* three.

Let us decide now, if we can, what position the Tuolumne Cañon occupies among the river gorges of the Sierra. These gorges corrugate the entire western flank of the range from Shasta to Tehachipi, a distance of nearly five hundred miles; for all of the rivers, and frequently their several larger branches, flow in these deep trenches,— as we shall generically term them for convenience,— and you cannot travel along the range more than twenty miles without encountering at least one of them. If measured from the dividing ridges, their depth will vary from 1,000 to 8,000 feet, or, if measured from the brinks of the trenches to the streams below, from 500 to 5,000 feet. These trenches may be divided into valleys, cañons, and gorges, distinguished by the slope of the walls and the character of the floors or bottoms. The most frequent of these forms is, of course, the cañon; and of the two kinds, the V-shaped and the U-shaped, the former is predominant. The V-shaped cañons are the channels by which most of the rivers of the northern and middle Sierra flow down the slope of the range to the interior valleys of California. Imperfect types of the valley or gorge form may be traced about the heads of these cañons, but they are not sufficiently well-defined to bear comparison with the similar forms in the southern trenches. All of the trenches, however, exhibit the V-shaped cañon form in their course through the forest belt and the foot-hills. It is in the upper fir forest belt and on the lower flank of the belt of the High Sierra that the trenches vary from the V-shaped cañon form.

The valley form is best seen in the Yosemite. Its distinctive features are abrupt walls, at the bases of which lie talus heaps, and a flat or nearly flat floor of considerable width. These valleys are found along the river trenches at distances averaging twenty miles from the main crest of the range. They occur on the Tuolumne, the Merced, the north and main forks of the San Joaquin, the north, middle, and south forks of the King's River, and the Kern. Below these valleys their respective rivers flow through V-shaped cañons, and, in one or two instances, gorges. Above, they flow either in gorges or in what might be termed nondescript depressions, whose forms partake on a small scale of one, two, or all three types.

The distinguishing characteristics of the gorges are abrupt or nearly abrupt walls, so close together as nearly to meet at the bottom, leaving but little room for the passage of the stream. These occur usually above the valley forms or yosemites, though in some cases, as that of the north fork of the San Joaquin, the gorges are below the yosemites.



THE MOUTH OF MUIR GORGE.
From a photograph by Theodore S. Solomons.

Above the King's River Cañon, or the yosemite of the south fork of the King's River, the trench is a combination of the cañon and valley forms. Above the Tehipitee, or yosemite of the middle fork, the trench is the same, but verges more upon the cañon for a distance of twenty miles, when some gorges occur, reaching back toward the crest. On the north fork the trench above the valley is nondescript. It is cañon-like above the yosemite of the main fork of the San Joaquin, and nondescript above that of the north fork. Above the original Yosemite, or the valley of the Merced, it is also nondescript, though undeniably fine from the perfect and continuous glaciation of the solid granite trough through which the main river and its many branches flow.

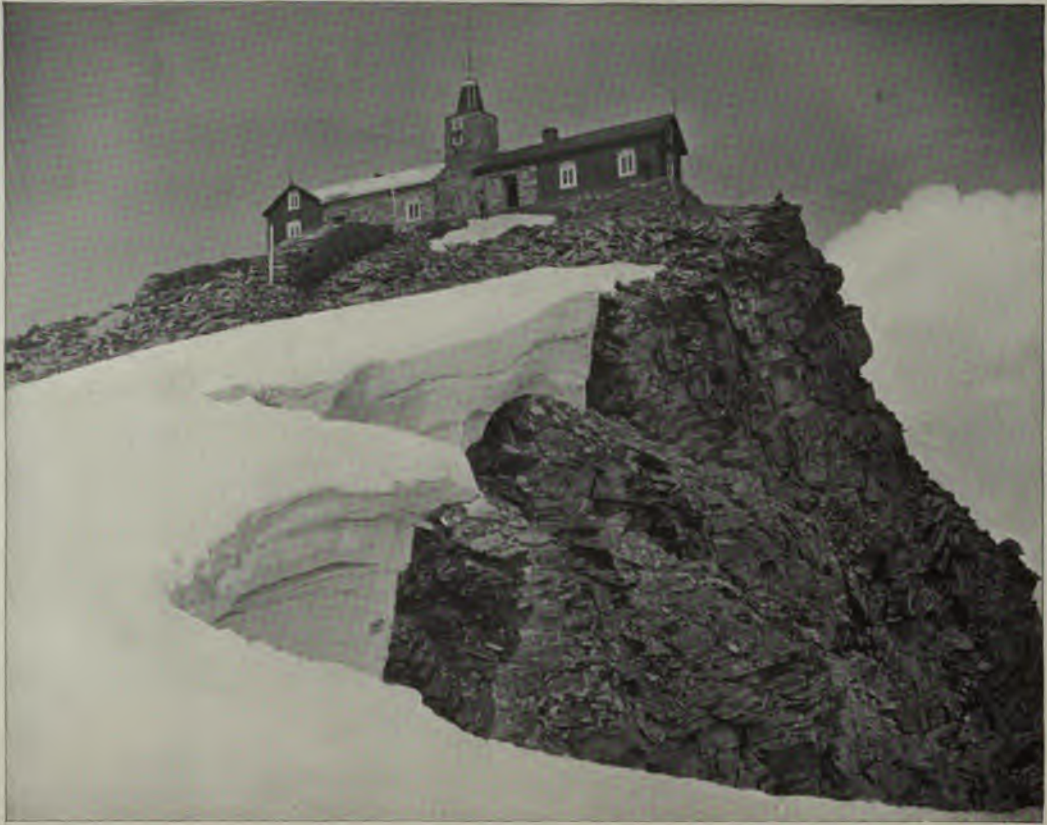
In the Tuolumne we have a unique succession of varied trench forms. The river finds its source among glaciers the most extensive and in every sense the finest in the whole southern Sierra. Its upper reaches are in groves and meadows of singular beauty and amplitude. Its trench becomes then of the nondescript variety, but is made remarkable by the immense rocks which loom above it on either hand,—which give it in certain localities a remarkable resemblance to Yosemite,—and by the wonderful succession of falls and cascades by which the river makes its descent. The nondescript form then changes by insensible degrees to the highest type of the gorge form, which is maintained to Pait Valley, a distance of over ten miles. This is succeeded by a V-shaped cañon, which finally opens on Hetch-Hetchy Valley.

The water forms of the upper part of the cañon are easily equal to the falls of the Yosemite in totality of scenic value, if this is a permissible mode of comparison. If, however, it be claimed that the fact that the Yosemite Fall is without a rival in height confers, in itself, superiority upon the latter valley, all we need do is to point to the Muir Gorge and ask if any feature of the Yosemite can be likened to this dreadful abyss, with its 5,000 feet of precipice depth and the rush and surge and roar of its maddened waters. Thus, having matched the unique by the unique, we have left for comparison only the walls and the floor of the Yosemite.

As we have seen, the Tuolumne Cañon walls are in places much higher than those of the Yosemite. Their color, smoothness, and other features are identical; and when we remember that these gorge walls extend for ten miles instead of five, as in the Yosemite, it is obvious we have a greater totality of sheer wall; and this apart from the grandeur of the crested peaks by which these walls are surrounded. As to the floor in Pait Valley and elsewhere throughout the cañon, we have as beautiful bits of garden and meadow as are, or rather *were*, to be found in the Yosemite. Nothing in the latter valley, however, can produce the impression which is made upon him whose rare fortune it is to survey the bottom of the Tuolumne Cañon from end to end.

In the V-shaped cañon, 5,000 feet deep, from Pait Valley on, the traveller is treated to another experience which he cannot enjoy in the Yosemite; and here we pause. The end of the cañon might be said to be reached at the entrance to Hetch-Hetchy Valley, and the latter considered a distinct act in the drama of the ice. But if we have not fully made out our case against the Yosemite, we may easily kick the beam by throwing into the scales — in a highly figurative sense, of course — this Tuolumne yosemite; for, indeed, why should not Hetch-Hetchy be considered a part of the Grand Cañon of the Tuolumne? It is, as it were, its stately corridor, and in it we have a true yosemite on a small scale, for its walls are as sheer and two-thirds as high, its floor as level and as gardened, and its falls of a corresponding ratio in height and setting to those of the Yosemite.

From its great width and its accessibility the Yosemite permits the tourist at Inspiration Point to behold at a glance its grandeur and beauty; and it is doubtful whether his subsequent inspection of its scenery at closer range will evoke within him any stronger emotions or more fervent admiration than that which spontaneously overwhelms him — if he be human — on thus first gazing at the distant valley. The Tuolumne Cañon, on the other hand, does not display its high qualities so freely and openly. Its true entrance is concealed among the distant summit peaks; and from no point short of a fatiguing and dangerous approach to the



SONNBLICK OBSERVATORY FROM THE SOUTH.

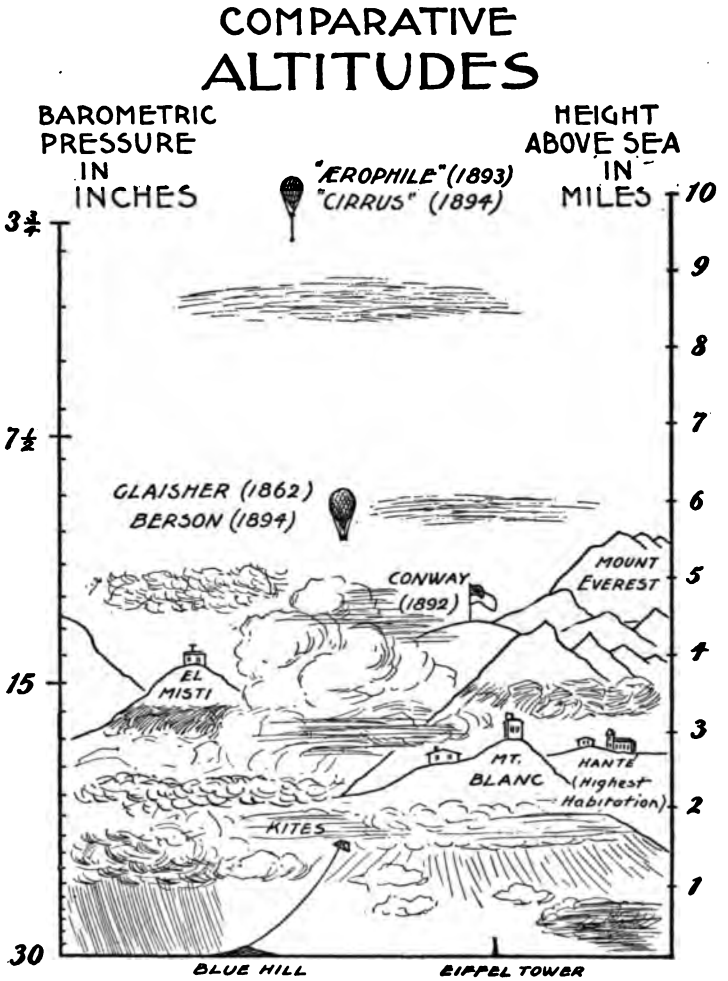
edge of its walls can the traveller gain a vantage from which more than a small part of the long, winding gorge may be seen at a time. But let him make the entire descent from the meadows, — as it is to be hoped he may do some day by a good trail, — I will not say a wagon road. Its inspirations, its spells, will be cumulative. The farther he goes the more bewildered and stunned, and yet the more entranced and ravished will he become. From the closeness of the walls and the immensity of every element of the constantly changing landscape, new meanings will attach themselves to his conceptions of size, depth, and mass. And when finally he emerges into Hetch-Hetchy Valley, I am convinced that the sum of his impressions will be far greater than that which the Yosemite is capable of producing in him. This, after all, — the measuring of the total effect upon the average beholder (if indeed such subtleties are susceptible of measurement), — is our only means of estimating the comparative scenic value, and assigning a rank to such stupendous wonders as the Yosemite and the Grand Cañon of the Tuolumne.

The Exploration of the Air.

BY A. LAWRENCE ROTCH, DIRECTOR OF THE BLUE HILL METEOROLOGICAL OBSERVATORY.

Read May 13, 1896.

AT first sight it may seem as if the exploration of the air were outside the province of this Club; but when it is remembered that mountains are our chief means of exploring the lower air, and that clouds, which either obscure or increase the beauty of the views from mountains, give us most of our knowledge of the upper air, it will be recognized that the paths of the mountaineer and of the meteorologist are often identical, and their lofty rendezvous has put the meteorologist under a debt of gratitude to the alpinist, since many of the mountain meteorological stations in Europe have been



erected largely by the aid of the Alpine Clubs. Our own Club has also shown its interest in meteorology by establishing observing-stations in Northern New England when the New England Meteorological Society began its pioneer work of determining the climate of this region twelve years ago.

With this apology for my subject, I will ask you to consider the lower portion of the atmosphere, that which lies within ten miles of the earth and contains eight-ninths of the whole mass of air, a vertical section of which is represented in the accompanying diagram of Comparative Altitudes. Meteorologists are concerned with this portion alone, for within it occur all the atmospheric disturbances which affect us. Assuming the temperature constant as we rise in the air, the pressure would be halved for each three and one-half miles of ascent; but in the actual case of temperature diminishing at the rate of about 20° Fahr. per mile, the decrease of pressure is shown by the scales of barometric pressure and height to be more rapid. At extreme altitudes the temperature of the air must be very low, far below any natural temperature on the earth.

It is seen from the diagram that man, in balloons, has only twice penetrated into the stratum five and one-half miles above the sea, which the loftiest mountains attain. Unmanned balloons have, however, risen ten miles. The diagram also indicates the height to which man has climbed mountains, and the highest places at which meteorological observations are made. The levels at which the different clouds float in the atmosphere are shown; and, as standards of measurement, there are added the Eiffel Tower, the tallest structure erected by man, and our neighboring Blue Hill, with the highest kite ascent which has been made from it.

The subject of mountain meteorology has already been ably presented to the Club by Professor W. M. Davis (see APPALACHIA, Vol. IV. Nos. III. and IV.); so I shall in this paper describe the methods employed to solve some of its chief problems, such as decrease of temperature and humidity with elevation under normal conditions, and when areas of low and high barometric pressure prevail near the ground; the height to which these cyclones and anti-cyclones (as they are technically called) extend; and the circulation of the wind around each at various heights.

Only on mountains can be carried on the continuous observations of the meteorological elements which are necessary to determine their relation to the conditions prevailing at low levels, and mountain stations have therefore been fundamental in these investigations. When the earth's surface rises in plateaus, the advantage of elevation above the sea — that is, immersion in the upper strata — is almost neutralized, because the velocity and direction of the atmospheric currents, as well as the temperature and humidity of the air, are affected as at low levels by contact with the earth. For this reason meteorological observatories should be located on high and isolated peaks, although even here the conditions only approximate to those of the free air. The erection of high stations and the discussion of their observations during the past fifteen years have contributed most to the rapid progress lately made in the science of meteorology. Accompanying this paper are reproductions of photographs, made some six years ago, of the three highest meteorological stations in Europe.

The first summit station in the world was that established in 1870, jointly by the United States Signal Service and Professor J. H. Huntington, on Mt. Washington, New Hampshire, 6,280 feet above the sea. Probably nowhere else in the world has such severe weather been experienced, the lowest temperature being here often accompanied by the highest winds, unlike the calms which prevail with intense cold at low levels. For instance, in February, 1886, with a temperature of fifty degrees below zero, a wind velocity of 184 miles an hour was recorded on Mt. Washington. The government meteorological station on Pike's Peak, at an elevation of 14,134 feet, was for many years the highest in the world. Now both these stations are closed, so that there seem to be actually in the United States but two summit stations where meteorological observations are made throughout the year; namely, the Lick Observatory, on Mt. Hamilton, California,— primarily astronomical, — and the Blue Hill Meteorological Observatory in Massachusetts, situated at a very moderate elevation. For a limited time the Signal Service maintained stations on Mt. Mitchell, North Carolina, and on Green Mountain, Mt. Desert Island, Maine. The Weather Bureau has higher stations in the United States; but being upon plateaus, they are, for the reasons previously stated, excluded from consideration. Professor S. P. Langley's important researches on the nature and amount of solar heat received by the earth were carried on, in 1881, upon Mt. Whitney, California, whose summit is 14,500 feet above the sea.

It is due to one of our own institutions that the highest meteorological station in the world is now in Peru, near Arequipa, where the Harvard College Observatory several years ago established an outpost. In 1893 Professor Bailey succeeded in placing self-recording instruments on the summit of the neighboring quiescent volcano of El Misti, 19,200 feet high, when a former station on the side of Mt. Chachani,[1] near the snow-line, at an elevation of 16,650 feet, was abandoned. It is impossible for observers to remain at these stations; so they were provided with automatic instruments which should give a continuous record of the chief meteorological elements during two weeks. Several times a month one of the Observatory staff climbs the mountain in order to wind the clocks and change the register sheets, at the same time making a check-reading of standard instruments. Breaks in the record occur, owing to unforeseen stoppage of the instruments or inability to make the ascent at the appointed time. A meteorograph, recording continuously the chief elements during four months without attention, which was constructed by Mr. Fergusson of the Blue Hill Observatory for this high station, will, it is hoped, obviate these difficulties.

France stands unrivalled in her superb chain of summit stations on the Puy de Dôme (4,800 feet) in Auvergne, on the Pic du Midi (9,440 feet) in the Pyrenees, on the Mont Ventoux (6,250 feet) in Provence, and on the Aigoual (5,158 feet) in the Cevennes. Their construction has cost the National and Provincial governments hundreds of thousands of dollars and years of time. They are generally defective in having no co-operating base stations, and their observations have not been published in detail. In 1890 M. Vallot, a devoted alpinist and meteorologist, established several stations on and near Mont Blanc, from which records have been obtained each summer since. The highest of these stations, at the Rochers des Bosses (14,320 feet), is provided with many self-recording instruments operating two weeks without attention, which are looked after by the owner or his guides each week or two during the summer. This cabin was quadrupled in size in 1891–92, and the refuge formerly located there by the public-spirited proprietor was removed to a separate building. The much-talked-of observatory of M. Janssen, sunk in the snow on the very top of Mont Blanc, 1,460 feet higher, is still idle, since the meteorograph made for it in Paris at a cost of $3,000, which was intended to record continuously all the meteorological elements during a period of eight months without attention, cannot be kept in action. An astro-meteorological observatory on Mont Mounier (9,250 feet) in the Maritime Alps has lately been built by M. Bischoffsheim, the generous founder of the observatory on Mont Gros, near Nice. On the Eiffel Tower in Paris are instruments, 980 feet above the ground, which give more nearly the conditions prevailing in the free air than do any others permanently at this elevation. They record at the Central Meteorological Office, a quarter of a mile distant, side by side with similar instruments exposed near the ground.

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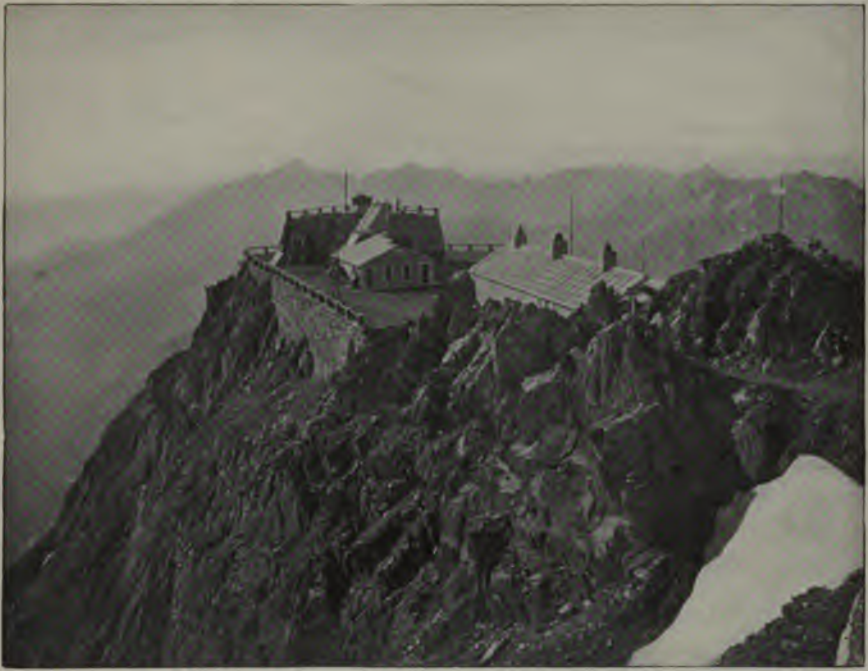
[1] Photographs of these mountains, by Professor W. H. Pickering, appeared in APPALACHIA, Vol. VII. No. III.

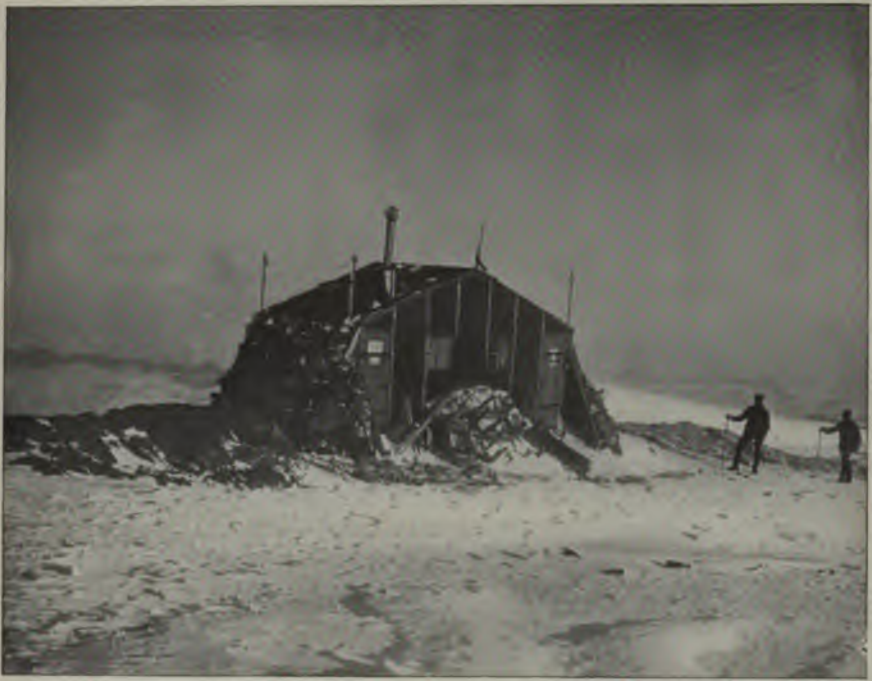
Among the Austrian and German stations, that on the Sonnblick, a peak of the Austrian Alps, 10,170 feet high, and the highest permanently occupied observatory in Europe, stands pre-eminent, having furnished very valuable results under Dr. Hann's direction. The newest mountain observatory in Germany is on the Brocken (3,750 feet) in the Harz Mountains, where a station of the first order has replaced the irregular observations previously made there.

Switzerland, which since 1873 has maintained stations in mountain passes, etc., has now on the Säntis (8,200 feet), in the Canton of Appenzell, one of the best located and best equipped summit stations in the world; and in Italy an observatory on Mt. Cimone (7,100 feet), in the Apennines, near Lucca, was completed a few years ago.

On Ben Nevis (4,400 feet), the highest mountain of Great Britain, there is a remarkable station, where during twelve years an unbroken series of hourly observations has been maintained. There is a base station at sea-level; and the advantageous situation on the west coast of Scotland renders the results of the observations which have been discussed by Dr. Buchan of great value.



PIC DU MIDI OBSERVATORY FROM THE NORTHWEST.



VALLOT OBSERVATORY, MONT BLANC FROM THE SOUTH

The most obvious method of ascertaining the motion of the upper air currents, and to some extent their differences of temperature, is by means of the clouds, which were early objects of study by meteorologists, but until lately only their form, quantity, and direction of motion were noted. Within the past few years the first detailed measures of height and velocity have been made at Upsala, Sweden, and at my own observatory on Blue Hill, near Boston; and this year, by means of international co-operation, a dozen countries are engaged in this important work. Trigonometrical measures with visual or photographic theodolites enable the height and velocity of different species of clouds to be calculated, while their direction of motion and apparent velocity are more generally observed by simpler instruments. The discussion of these correlated observations is expected to increase our knowledge of the atmospheric circulation. Already the observations made at Blue Hill in 1890–91 have disclosed some interesting facts regarding the upper air currents. Measurements with the theodolites showed the highest clouds — those of the cirrus, or feather, type — to be occasionally nine miles high, and sometimes to travel 230 miles an hour in the winter season; for the Blue Hill observations indicate that the entire atmosphere, from the lowest to the highest level, moves almost twice as fast in winter as in summer. The average height of the cirrus during the year is about 29,000 feet, or less than six miles, and the mean velocity is 89 miles an hour, showing, in connection with similar observations on lower clouds, — such as the alto-cumulus and alto-stratus, — that between two and nine miles there is an almost continual westerly current of great velocity, a comparison of the average velocities at different heights indicating that from the lowest to the highest clouds the increase of velocity is a linear function of the height.

The only way in which the temperature and humidity of the highest regions can be determined is by means of balloons, and the ambition to explore this aerial ocean early led the scientists of all nations to make balloon ascents.

As the first mountain-top station was in New England, so the first scientific balloon ascent was undertaken in 1784 by a Bostonian, Dr. John Jeffries, then residing in London. He observed the barometer, thermometer, and hygrometer; and his successors did the same, with little improvement in apparatus. Among the most famous ascents of the present century was that of Gay Lussac, who in 1804 reached 23,000 feet; that of Barral and Bixio in 1850, and of Welsh in 1852, in both of which nearly the same altitude was attained. In 1862 the English aeronauts, Coxwell and Glaisher, became unconscious at 29,000 feet; and in 1875 this height was nearly equalled by the French aeronauts, Crocé-Spinelli, Sivel, and Tissandier, when the two former were asphyxiated, although a supply of oxygen was carried to assist respiration. This fatal accident served to check further high ascents until two years ago.

The early balloon ascents were productive of little good to meteorology, because the temperatures and humidities obtained were very erroneous, owing to direct insolation, radiation from the heated gas-bag, and insufficient ventilation of the instruments. It is due to the German Aeronautical Association, and to Dr. Assmann of Berlin in particular, that more trustworthy methods of observing temperature and humidity were devised. By means of an instrument called the aspiration psychrometer, hung outside the balloon, and in which a current of air is drawn past the bulbs of the wet and dry bulb thermometers, enclosed in polished metal tubes to cut off the direct solar or reflected heat rays, the great errors of the ordinary methods are avoided.

As an illustration of modern methods of observation, there may be mentioned an interesting series of observations over Berlin in 1891, in which the writer assisted, where observations at three different levels were taken simultaneously. On the ground were placed self-recording instruments; under a captive balloon, 2,000 feet above the earth, an aspirated meteorograph recorded automatically temperature, pressure, and humidity; while in the basket of the free balloon Dr. Berson and the writer observed the barometer, the aspiration psychrometer, etc. There being little wind, our balloon floated over Berlin at an average height of 3,600 feet, so that the three sets of observations, nearly vertically above one another, permitted the true temperature and humidity in the stratum of air three quarters of a mile thick to be deduced.

Dr. Berson in 1894 ascended alone to perhaps the highest point ever reached by man; certainly his barometer reading of 9.1 inches, corresponding to an elevation of approximately 30,000 feet, is the lowest ever made. At this height of nearly six miles, the aspirated thermometer read fifty-four degrees below zero, Fahr., and a thermometer exposed to the sun's rays eleven degrees below zero. Dr. Berson inhaled oxygen at times, and suffered little from this extraordinary ascent.

But this investigation of the air is not limited by the height at which man can breathe; for by means of small free balloons, carrying no aeronaut but only self-recording instruments, the temperature has been approximately determined ten miles above the earth. The first trials made by M. Hermite in France gave somewhat unsatisfactory temperature determinations, owing to unsuitable instruments; but a probable height of ten miles was reached by his balloon called *L'Aérophile.* The German Aeronautical Association afterwards experimented with these balloons; and one of them, the *Cirrus*, in July, 1894, rose to a height, as computed from its aneroid barometer record, of over ten miles, travelling 650 miles in ten hours, and then falling to the ground with its instruments uninjured. The Society having been notified by the finder, according to a polyglot request on the balloon, it was recovered and brought back to Berlin. In order to avoid freezing of the ink in a register pen at the extremely low temperature which it was supposed might be encountered, an alcohol thermometer was arranged to record by photography, while the intense action of the sun upon the thermometer undiminished by atmospheric absorption at these great altitudes, was neutralized by a current of air induced by an exhaust fan driven by a weight attached to a cord hanging from the balloon. With a barometric pressure of 3.3 inches (less than one-ninth of that at the earth's surface, and indicating a height of about ten miles), a temperature of sixty-four degrees below zero, Fahr., was recorded. A greater height and a lower temperature were probably reached; but the barometer register was not graduated lower, and, owing to the stoppage of the aspirator, the recorded temperatures were undoubtedly too high. Recent experiments with these abandoned balloons in France, by MM. Hermite and Besançon, have given temperatures of ninety degrees below zero, Fahrenheit, at a height of ten miles.

The changes of temperature up to one thousand feet have been investigated in Europe by the use of captive balloons, which are, however, driven downward by strong winds, subjecting the instruments carried by them to violent shocks. Kites fly higher in strong winds, and cost very much less than captive balloons. Their use in meteorology dates from 1749, when Dr. Wilson, of Glasgow, employed kites to lift thermometers into the clouds; and in 1752 Franklin, as is better known, used a kite to collect electricity from the atmosphere. This experiment, with electrometers for measuring the potential, was repeated by A. McAdie at Blue Hill in 1891 and 1892. In 1884 E. D. Archibald, in England, investigated the wind velocity at different heights by means of anemometers attached to a kite wire, and photographed the ground by means of a camera supported in the same way.

Interest in scientific kite-flying has lately been aroused by W. A. Eddy, who introduced tailless kites into this country. On Blue Hill during the summer of 1894 the first instrument recording continuously its indications was raised a quarter of a mile by such kites flown in series; and since that time experiments have been in progress there with kites as a means of getting records from the free air. Important improvements have recently been effected in the kite apparatus and in the recording instruments employed at Blue Hill Observatory. Both the tailless, or Eddy, and the cellular, or Hargrave, kites, covered generally with varnished cloth, are flown in series in either light or strong winds, and even in rain and snow storms. Piano-forte wire has been substituted for string, and a windlass serves to manipulate it. A meteorograph, which is carried by the kites, constructed at the Observatory by Mr. Fergusson, weighs only two and one-half pounds, and yet it records automatically and continuously the temperature and humidity of the air and the velocity of the wind. A somewhat similar instrument, which was made for me in Paris, weighs three pounds with its aluminum case, and records also the barometric pressure, from which the altitude may be calculated, as is always done, from the length of wire and its angular elevation.

Since the use of wire the maximum heights attained have been doubled; and twice during the past month a record has been obtained in the free air nearly 4,000 feet above the hill, or about seven-eighths of a mile above the sea. In each case a warm wave was approaching from the west, and the temperature aloft was found to be much above normal. Many other interesting facts are being revealed by the kite ascents, which are made on the average twice a week. It seems probable that this simple method of "sounding" the atmosphere will be employed daily in the future at our Weather Bureau stations, and that the meteorological conditions prevailing in the free air a mile or more above the ground will be telegraphed to Washington to form a synoptic chart for forecasting, as is now done for the observations at the earth's surface.

Notes on a Recent Visit to Ktaadn.

By Fullerton L. Waldo.

Mr. Henry H. Richards, a classmate at Harvard, and I left the Aroostook House at Sherman, Maine, at noon on the 16th of September, for Patterson's, on the East Branch of the Penobscot. After passing a saw-mill some distance beyond Staccyville, the road was exceedingly bad,—the wagon-wheels at one time jarring over boulders, at another sinking to the axles in mud. After two hours of such riding, during which the horses were unable to trot more than once or twice, we came out at the deserted Hunt farm, in a little green meadow on the banks of the Penobscot. Soon afterward we reached the house called "Patterson's," which is at present kept by Luther B. Rogers, of Patten, as a depot of supplies for the loggers and others.

Here we learned from Daniel H. Perry, the veteran guide to the region, that the Appalachian path was so overgrown as to be very difficult to follow, that the Appalachian huts at Ktaadn Lake and Ktaadn Basin Pond had been destroyed by fire, and that all the signs and the cylinder had been swept by the winds from the summit of the mountain. The recognized route from Patterson's to Ktaadn lies at present over a rough lumber-road which passes around Turner Mountain, thereby making this route about nine miles longer than the Appalachian path.

On the following morning we secured the services of a cousin of Perry as guide and porter, forded the East Branch, and started in a buckboard along the (true) left bank of the Wassataquoik. Four hours of travel over a woodland road somewhat better than that of the day before, during which we had occasional glimpses of Ktaadn peeping over the shoulder of Turner Mountain, brought us to Robar Camp. Just before reaching the camp a sign is passed marking the beginning of the Appalachian path.

We left Robar Camp at half-past one on foot (though it was still possible to ride), and reached City Camp about two hours later. The country through which we passed, having been recently burned over, was barren and desolate in the extreme, though occasional groups of white birches or pines along the road varied the monotony of the scene. An hour after leaving City Camp we reached Bell's Camp, where we spent the night. These new lumber-camps are not occupied except in the winter, and nothing in the way of food or of cooking utensils is to be found, except by chance, at any one of them; but they are well-built and clean, and are placed at convenient intervals along the river, so that they furnish excellent stopping-places at the end of a day's march.

We left Bell's Camp at seven o'clock on the following morning, followed the continually dwindling road three miles farther to McLeod's Camp, and soon afterward struck off into, first, a wagon-track through long grass, and low, marshy land, where it is not difficult to lose the trail; then, crossing the brook on a fallen log, we entered upon a well-blazed and gradually ascending path through the woods. At a clearing, perhaps two miles from the mountain, we got our first near view of Ktaadn. We had still better views at a grimy little lake below our first outlook, and again from a dry lake-bed farther on. After leaving the latter behind, we passed along the parched bed of a brook, fringed with tall grass, and then through thick woods for a short distance, coming out at the ruins of the Appalachian shelter on the shores of Ktaadn Basin Pond. Here we spent the night under a lean-to of poles and spruce-trees covered with our rubber blankets.

On the following morning (the 19th of September) we left the camp at half-past six for the summit of the mountain. The temperature at this hour was 32.1° ; the minimum during the night had been 30.3°.

Retracing for a few rods our route of the day before, we turned to the left over a somewhat overgrown path, and in a few moments had reached a dry brook-bed, with small birches arching over it. Scrambling over the rocks and under the trees, following a "spotted trail," in about three-quarters of an hour we were above the tree-line, and began to have views of the flat country lying to the east of the mountain. At half-past seven we reached the top of the ridge connecting the West and North Peaks. Thence, inwardly marvelling at the vast extent of lake-country spread out before us, and the wonderful cliffs encircling the Basin, we ascended the West Peak, and crossed the East Peak and the Narrows to the Chimney. Thus in a sentence I have dismissed an experience the memory of which any one who visits Ktaadn will treasure for a lifetime. I will only say that I think the passage of the Narrows cannot be called either dangerous or difficult, when made in fair weather by a person of ordinarily steady nerves.[1]

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[1] A few words of explanation may help Club members who visited Ktaadn in 1886 and 1887, to understand Mr. Waldo's route. The 1886 party left the tote-road, crossed the Wassataquoick River, and went to the Basin Pond via Ktaadn Lake. Probably that part of the path which went through the big blow-down, not far from the southern base of Turner Mountain, is not only badly overgrown, but also filled with more fallen timber. Mr. Waldo followed the tote-road up the Wassataquoick to Bell's Camp, as did also the small party of Club members in 1886. They, however, reached the Basin by going over the north summits of Ktaadn, and descending from the Saddle. Mr. Waldo went between Turner Mountain and the north summits of Ktaadn. His route

From the Chimney we descended into the Saddle; and, imagining that we had discovered an easy and short route into the Basin, started downward over what one of Mr. Whymper's "free-thinking mountaineers" might have called a pass. We got along very well, though in some places the rocks were dangerously icy, until, when it seemed as though we might cast a stone into the dark waters of the Basin Pond, a huge rock, jutting out from the slide, brought us to a sudden stop. There was no means of getting past this obstacle, except by going out upon the cliffs. Perry adopted the latter method of surmounting the difficulty; but as the rules of Harvard College required registration on the last Thursday of September, Richards and I decided to make an ignominious retreat to the ridge far above. We did so, and came down to the Basin Camp over the vast, rounding bulk of Pamola, descending several of the rather ticklish cliffs overhanging the Basin Pond. We did not get back to camp until 1 P. M.; and as food was giving out, we broke camp, and started for Patterson's directly after dinner.

I had defeated my own ends in taking both an 8 × 10 and a 4 × 5 camera into the Basin, as I was thereby prevented from carrying my share of the provisions; and the others, heavily burdened though they were, could not carry enough to permit of an extended stay. I may add that, owing to an unfortunate mishap, I have only one poor photograph — and that not of Ktaadn — to remind me of the weight of an 8 × 10 camera, solidly built, and packed with all sorts of useful articles.

We marched down through the woods to McLeod's Camp, and there spent the night. On the following morning we left

is somewhat shorter and much easier than that taken in 1886; but it is seven or eight miles longer than the Club route, and probably offers no views of Ktaadn which can compare with those from Ktaadn Lake and the bog. It is unfortunate that the travel to Ktaadn is not sufficient to keep the Club path open, and that the guides are not enterprising enough to do a little cutting in place of extra travelling. The guide, Clarence R. Peavey, the main reliance of our Club members in both 1886 and 1887, is no longer near Ktaadn. He now has several hunting-camps in the Aroostook region, and enjoys excellent patronage. As to the danger in passing along the Narrows, I will refer to any of the ten women of the Appalachian Mountain Club who have enjoyed that grand experience. — ROSEWELL B. LAWRENCE.

McLeod's at six, and reached Patterson's, after a hard day's tramp, shortly after five in the afternoon. Early in the morning of Saturday, the 20th, we left Patterson's on a "toting-team" which happened to be going in to Staceyville. We covered the ten miles[1] or so to the latter village in the remarkably fast time of three hours; and, walking up the railroad track to Sherman, boarded the "Flying Yankee" there at a quarter-past ten. We reached Cambridge the same evening.

I am under obligation to Mr. Lawrence for the note appended to my paper. His remarks regarding our route are, I think, entirely correct. He is also doubtless right about the views. Turner Mountain prevents one from seeing anything of Ktaadn all the way from Robar Camp to Bell Camp. (The distant view of Ktaadn from the hills between Sherman and Staceyville is, I may add, about as striking as anything one may see on the entire trip, before reaching the mountain itself.)

We were informed at Patterson's that the loggers still go, even with teams, over the Appalachian route as far as Ktaadn Lake, at the southeastern end of which there is a small hut for the men who take care of the dam in the spring; but, at the same time, Perry and others stated that it would be dangerous, if not impossible, on account of the overgrowth, for novices to continue farther by this route. As our time was limited, we were most anxious to go by the shorter route, and it was only the repeated assurances of its danger and difficulty that kept us from attempting it.

The rock of which I speak as jutting from the slide below the Saddle, can hardly have been there when the party of 1886 passed. It now forms a serious obstacle to what might

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[1] Approximate table of distances (given by Daniel H. Perry, and confirmed by Mr. Rogers's agent at Patterson's): —

	Miles.
PATTERSON'S	0
ROBAR CAMP	10
CITY "	16
BELL "	18½
McLEOD'S CAMP	21½
BASIN POND	27 (?)

otherwise prove a convenient, though not very easy, route from the summit to the Basin.

Daniel H. Perry, of Sherman Mills, Maine, makes a specialty of guiding parties to Ktaadn. Although we were unable to get his services, as he was engaged, yet I feel sure that he may be recommended, as his reputation at Patterson's for knowing the region thoroughly is first-rate. The present route is generally so plain, however, that the only place where a guide may be of real assistance is between McLeod's Camp and the crossing of the stream, beyond which one enters upon the well-blazed path through the woods.

Proceedings of the Club.

February 10, 1896. — One Hundred and Sixty-second Corporate Meeting.

President Parsons in the chair.

Ninety persons were present. Eleven candidates for Corporate membership were elected.

Mr. Edwin S. Balch, President of the Geographical Society of Philadelphia, presented a paper entitled "Ascents near Saas" (see page 157). Several photographs from the Sella Collection were used in illustration.

Professor William H. Niles addressed the Club upon "Charles Lyell and the Modern Interpretation of Mountains." The speaker gave a very clear and interesting account of the great geologist's life and work, dwelling especially upon his travels and studies in Switzerland and America, and concluded with an impressive allusion to the great monument which Americans have dedicated to him, Mt. Lyell in the High Sierras.

Mr. R. B. Lawrence showed a few lantern views of the Aroostook hunting-camps belonging to Clarence R. Peavey, the guide who conducted the Club party to Ktaadn in 1887.

March 13, 1896. — One Hundred and Sixty-third Corporate Meeting.

President Parsons in the chair.

One hundred and five persons were present. Nine candidates for membership were elected.

According to the notice upon the call for the meeting, the following Amendment to the By-Laws came up for action, and was passed without opposition: —

To amend Article XII. by omitting the words, "the afternoon of," so that it shall read : —

Art. XII. The Council shall call a regular meeting of the Club in Boston in each month, excepting July, August, and September; also, special and field meetings at such times and places as may seem advisable. The Council may delegate the power to call meetings. The January meeting shall be the annual meeting, and shall be held on the second Wednesday of that month. Eleven members shall constitute a quorum for business.

Dr. Lyman B. Sperry, of Bellevue, Ohio, addressed the Club on "Recent Scenic Discoveries in Montana and the State of Washington." The informal talk, as the speaker called his address, was replete with information and amusing incident, and was finely illustrated with a large number of lantern views showing the grand and beautiful scenery of Lake Macdonald, Avalanche Basin, and Lake Chelan.

April 8, 1896. — One Hundred and Sixty-fourth Corporate Meeting.

President Parsons in the chair.

Fifty-five persons were present. Seventeen candidates for membership were elected.

The publication of the new Map of the Country about Boston was announced, and the Councillor of Topography had copies for sale at the meeting.

Miss Elizabeth C. Fisher addressed the Club on the subject, "From Lachine to High Rock, Canada." This was a tour in search of minerals, but including observations upon mountains and valleys. Fine specimens were shown of fossils, graphite, tourmaline, and other minerals.

Professor George H. Barton presented "Notes on the Geology of the Berkshire Hills," particularly concerning the history and structure of Greylock and Hoosac Mountains.

Professor C. H. Hitchcock of Dartmouth College also made a few remarks.

April 16, 1896. — Special Meeting.

President Parsons in the chair.

Seventy persons were present.

Several short papers were presented describing the various trips taken during the recent Snow-shoe meet at Bartlett, N. H.

Mr. W. R. Davis opened with a general account of the excursion. Then followed Miss S. N. Macomber, on Mt. Willard; Miss M. A. Coe, on the Mt. Washington River, read by Miss C. M. Endicott; Miss L. A. Jones, on Mt. Langdon; Mr. W. Coffin, on Mt. Washington; Miss M. A. Furbish, on Mt. Carrigain; Mr. G. H. Taylor, on Table Mountain; Miss H. E. Endicott, on Mt. Silver Spring; Mr. G. M. Jones, on Mt. Tremont ; Mr. R. B. Lawrence, on Bear Mountain.

These papers described the views from the summits and the many pleasures of winter sport.

May 13, 1896. — One Hundred and Sixty-fifth Corporate Meeting.

President Parsons in the chair.

One hundred and seventeen persons were present. Thirteen candidates for membership were elected.

Mr. A. Lawrence Rotch presented a paper entitled "The Exploration of the Air: mountains, clouds, balloons, and kites as aids in meteorological research" (see page 179). After explaining meteorological conditions at different altitudes, the speaker described the various mountain stations. He then spoke concerning clouds, their height and velocity, balloons, including free balloons and kites, from the time of Franklin to the present day. The use of kites at the Blue Hill Observatory was particularly described. He concluded with remarks upon the physiological effects of high altitudes. Fine lantern illustrations were shown.

Mr. Charles H. Ames spoke upon the Preservation of Game. Much interesting information was given concerning fishes, birds, and large game which are rapidly being exterminated, the bison, fur-bearing seal, and plume birds being specially instanced. Hunting with the camera was enthusiastically recommended. Lantern illustrations were shown.

June 9, 1896. — One Hundred and Sixty-sixth Corporate Meeting.

President Parsons in the chair.

Seventy persons were present. Fifteen candidates for membership were elected.

A paper on Mt. Ktaadn was presented by Mr. Fullerton L. Waldo (see page 189). The Appalachian Club path being obstructed, the Wassataquoik tote-road was followed twenty-one miles from Patterson's, and then a logging-road between Mt. Ktaadn and Turner Mountain. The last part of the route was by the old path into the Basin. The ascent of the mountain was also described.

A paper entitled "In the Couloir of Mount Lefroy," by Mr. C. S. Thompson, was read by Mr. Parker B. Field (see page 121). This was a lively and entertaining description of the attempt on Mt. Lefroy in the summer of 1895 by three members of our Club. The paper was interspersed with written notes from Mr. Philip S. Abbot, and supplemented by remarks from Professor Charles E. Fay.

July 3 to 11, 1896. — Thirty-first Field Meeting, held at the Crawford House, White Mountains, N. H.

President Parsons presided at all the meetings.

One hundred and forty persons were present.

Friday evening, July 3, the Club met in the parlor of the Crawford House. President Parsons congratulated the members on being again among the mountains which they had done so much to make attractive, and on its being the largest Field Meeting in the Club's history. He then read a brief account of the thirty preceding Field Meetings, the present one being the fourth on this spot.

Mr. Harvey N. Shepard, the leader of the party, then outlined the programme proposed for the week. Saturday, Mt. Avalon was to be climbed. Monday, Mt. Washington, the walkers to go up the Crawford bridle-path, the others by rail; such as wished would remain over night, walking down or returning by railroad, as preferred. Wednesday, a trip to Mt. Carrigain, via the Sawyer's River Lumber R. R., on invitation of the Messrs. Saunders, the proprietors. Thursday, Mt. Webster by the new path made by the Crawford House managers. Friday, Mt. Willey. On Saturday the party would return to Boston.

On Sunday evening Rabbi Charles Fleischer, of Boston, a guest of the Club, gave a most interesting and forcible presentation of modern Judaism.

Tuesday evening, July 7, Professor J. F. Colby and George H. Moses, Esq., of the New Hampshire Forestry Commission, addressed the Club. Mr. Moses gave the history of the movement for a Commission. He stated that the legislature had thus far failed to make any appropriation for the purchase of forest lands, and that the Commission could do little but acquire information and attempt, in such ways as presented themselves, to educate the lumbermen and the people to the wisdom of forest preservation. The State would, however, accept and take by power of eminent domain any lands offered it without cost, and dedicate them to the use of the public forever, granting certain privileges to the donors. Under this law Mr. Moses hoped for a rivalry between different mountain resorts to establish parks, and called upon the Club to co-operate with the Commission in encouraging and promoting the purchase of forest lands to be put in the care of the State as public reservations.

Professor Colby followed in an able address on the educational features of the work; the lumbermen, the general public, the press, and the schools all being in need of enlightenment on the subject. Both Commissioners gave the Appalachian Mountain Club much credit for its work and influence in cultivating the love of nature, which should lead to greater interest in the mountains and forests.

In moving the vote of thanks to the Commission, which was passed, Mr. Shepard assured them of the assistance of the Club in their efforts to educate public opinion in the State.

On Thursday evening Mr. Frank V. Fuller gave an exceedingly graphic and entertaining account of "A Little Stroll through Mexico," with much interesting information as to the people, the scenery, and the customs of the country.

On Friday evening Mr. Albion A. Perry read an interesting paper on Thoreau, giving a biographical sketch of this genius of the woods and fields, with many new incidents and anecdotes, a review of his books and writings and a discriminating estimate of his character and life. The paper was much enjoyed by an appreciative audience. Mr. Shepard gave the arrangements for the return to Boston, adding a brief review of the week's excursions, all of which had been carried out exactly as planned, in spite of cloudy, foggy weather the first four days.

A vote of thanks to the Managers of the Crawford House for their attention and courtesy was passed unanimously, and the meeting dissolved.

October 21, 1896. — One Hundred and Sixty-seventh Corporate Meeting.

President Parsons in the chair.

One hundred and forty persons were present. Twenty-nine candidates for membership were elected. The President appointed the following committee to present a list of candidates for officers of the Club, to be voted for at the Annual Meeting in January: Messrs. Byron Groce, Charles C. Hall, Charles W. Folsom, Isaac Y. Chubbuck, and Miss Isabel Batchelder.

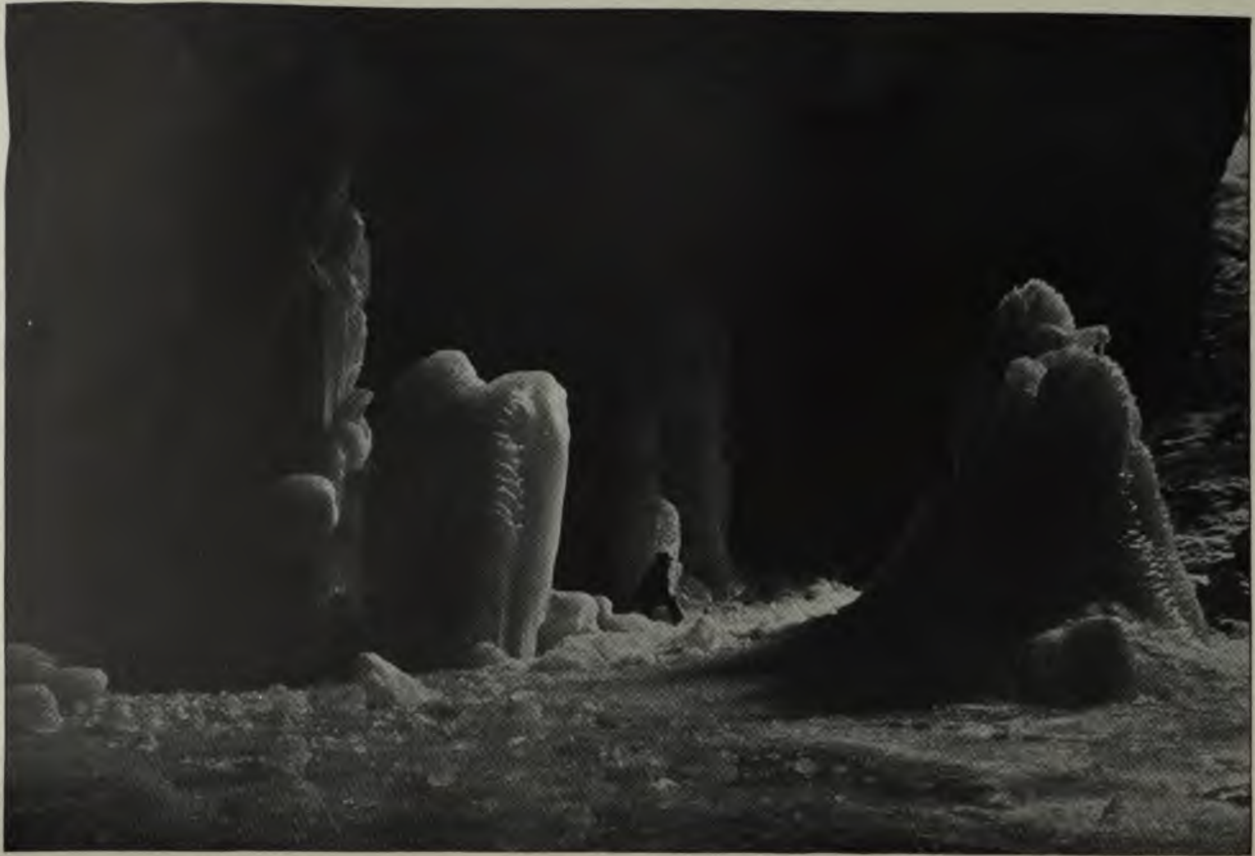
The remainder of the evening was devoted to a memorial meeting to Philip Stanley Abbot, who died on Mt. Lefroy, Canadian Rockies, on August 3, 1896.

After introductory remarks by the President, Professor Charles E. Fay presented a paper describing the trip and narrating the circumstances of the accident (see page 133). Lantern illustrations were then shown. A sketch of Mr. Abbot's life and character was given by Professor George H. Palmer, of Harvard College, who had known him intimately since childhood (see page 153). The meeting concluded with remarks by Dr. Lyman Abbott, of Brooklyn, N. Y., emphasizing the lessons of the brief but noble life and characteristic death of Mr. Abbot.

A letter was also read from Professor Charles Eliot Norton, President of the Cambridge Civil Service Reform Association, expressing his high estimate of Mr. Abbot as a public-spirited young citizen.

Members added since January, 1896.

Abbot, Edwin H., Cambridge.
Abbot, Edwin H., Jr., Cambridge.
Abbott, Miss Frances M., Concord, N. H.
Angier, Mrs. Albert E., Boston.
Ayer, Mrs. Wells W., Medford.
Beard, Daniel B., Lynn.
Bonney, Miss Katherine T., Boston.
Burrill, Charles L., Boston.
Chase, Mial W., Lynn.
Chase, Mrs. M. W., Lynn.
Chrimes, W. A. S., Brookline.
Clapp, Miss Alice V., Boston.
Clapp, Howard, Cambridge.
Coffin, F. S., Brookline.
Cook, Miss Fanny B., Brooklyn, N. Y.
Cook, Miss Jane T., Mattapan.
Crosby, John F., Newton.
Currier, Miss Frances W., Boston.
Darling, S. B., Somerville.
Davis, Miss Helen A., Newton Centre.
Doble, Ernest E., Boston.
Endicott, John, Canton.
FitzGerald, Chas. A., West Newton.
FitzGerald, Mrs. C. A., West Newton.
Foster, Miss Harriet W., Boston.
Fraser, Mrs. Harriet H., Boston.
Fuller, F. V., Chelsea.
Greeley, Mrs. Wm. H., Lexington.
Griswold, Miss Florence E., Dorchester.
Hacker, Miss Mary B., Lynn.
Ham, Albion P., Boston.
Hartwell, Mrs. Mary E., Cambridge.
Heald, Frank E., Manchester, N. H.
Hill, Miss Ella J., Boston.
Houghton, Miss Harriet P., Lynn.
Howe, Mrs. E. W., Roxbury.
Howell, Selah, Jamaica Plain.
Kneeland, F. N., Northampton.
Littlefield, Miss Hattie A., Roxbury.
Marsh, Edward B., Lexington.
Mason, C. N., Brookline.
Merrill, Miss Mary B., Roxbury.
Monzon, Joseph, Boston.
Moseley, Miss Jennie G., Dorchester.
Parsons, Mrs. Albert S., Lexington.
Peabody, Henry G., Boston.
Peabody, Miss Susan W., Oxford, Ohio.
Perkins, Theodore P., Lynn.
Ransom, George W., Boston.
Safford, Adelbert L., Beverly.
Sawyer, Isaac E., Holyoke.
Shorey, Miss Susan E., Lynn.
Smith, Miss Lucy M., West Roxbury.
Sperry, Lyman B., Oberlin, Ohio.
Stanley, Mrs. F. O., Newton.
Timlin, Oscar F., Boston.
Upham, Mrs. Lucy A., Brockton.
Wait, Wm. C., Medford.
Wait, Mrs. W. C., Medford.
Waldo, Clarence H., Boston.
Wallace, Fred A., Lawrence.
Wallace, Miss Margaret S., Newtonville.
White, Miss Elizabeth W., Lawrence.
Williams, Wm. H., Newton Highlands.
Wood, Miss Florence, Newton Highlands.



ICE STALAGMITES, CHAUX-LES-PASSAVANT.

From a photograph by E. Mauvilliers.

APPALACHIA.

Vol. VIII. BOSTON, JULY, 1897. No. 3.

Ice Cave Hunting in Central Europe.[1]

By Edwin Swift Balch.

Read December 8, 1896.

Among the best pleasures and privileges of the traveller are certainly those phases of the natural world which afford what may justly be termed great landscape impressions. One can instance the Matterhorn at sunrise, or the Arctic Ocean from the North Cape in a snowstorm, or the approach to the North African coast, or the glories of the Dolomite world from the nearly perpendicular towers of the Drei Zinnen, as scenes where one is brought face to face with the ever-wonderful phenomena of infinite nature, and which, once beheld, always linger in the memory as beautiful reminiscences.

It is needless to dwell on the grandeur of the mountain world in a paper addressed to members of the Appalachian Club, but it seems permissible to call their attention to a more neglected phase of nature where some weird landscape impressions may surely be found. For caverns certainly hold a distinct place among natural phenomena, and one entirely within the province of mountaineers; and, in fact, mountain and cave exploration have so many points in common that cave hunting has recently aptly been termed "mountaineering reversed."

Caverns of course may be investigated from many different points of view: there is that of the physical geographer, interested in their topography and their mode of formation; or that of the anthropologist, studying the remains of extinct animals

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[1] Copyright, 1897, by E. S. Balch.

and prehistoric man; or that of the tourist, who wishes to see some of the wonders of our planet. Rarest of all is the point of view of the ice cave hunter, who seeks to know why certain caves contain ice when other caves in the immediate neighborhood do not, and how the many curious underground phenomena in temperatures, and wind currents, and water supplies, can best be explained. With this latter phase, in fact, are connected some of the most intricate of subterranean scientific problems, as well as some of the most interesting of underground sights, and any one who cares for exploration can find plenty of opportunity among ice caves.

It is extremely difficult to make definite divisions in the various forms of perennial ice, especially as connected with caves. The subject, however, seems bounded by three extreme forms: glaciers, ordinary caverns, and ice caves. Leaving out of consideration glaciers and ordinary caverns, an approximate division may be made as follows: cold caves and windholes; ice gullies, ice troughs, and boulder ice; subsoil ice and subterranean ice sheets; freezing mines and freezing wells; ice caves proper and ice caves with windholes.

Cold caves are those where abnormally low temperatures are found, without these temperatures becoming low enough for ice to form. Windholes are cracks or holes in broken rocks whence draughts either issue or enter.

Ice gullies or ice gorges are ravines in mountain districts where snow and ice are sufficiently protected from sun and wind to remain long after snow in the surrounding open country, at the same altitude, has already melted away. Ice troughs seem to be a wider form of ice gully, found only in Siberia. Boulder ice is that which remains over in the taluses at the base of cliffs, or among the rocky débris in ravines.

Subsoil ice is found in Alaska and Siberia, in sheets or strata covered over and mixed with vegetable and mineral matter. A subterranean ice sheet exists on Mount Etna, covered by a flow of lava.

Freezing mines and freezing wells are somewhat rare occurrences. Connected with these forms of the handiwork of man, abnormally low temperatures sometimes occur, with the natural accompaniment of ice.

Ice caves proper vary greatly in their positions, shapes, and sizes. Some are very big; some very small. They may be divided into several classes: —

1. Ice caves at the bottom of cliffs, either entering into the mountain with a down slope directly from the mouth, or with a passageway before the ice cave proper is reached.

2. Ice caves where a large pit opens into the ground and ice is sometimes found in a side cave at the bottom of the pit, and more rarely where part of the pit is roofed over and ice is found underneath the roof. As a rule the air in caves of both these kinds is nearly stagnant.

3. In caves where cracks in the rocks are found, through which draughts occur; and, when this happens, we have what may be called ice caves with windholes.

Various theories have been advanced why ice forms in certain caves and not in others. Some have held that it is a remnant of a glacial period; others, that it is due to the presence of salts in the rocks; many think it is formed by draughts or evaporation or expansion of the air; others, that it is owing to pressure on the percolating waters. Peasants living near the caves almost always say that the ice is formed in summer and melts in winter.

From my own observations in fourteen ice caves, I am inclined to think that the main — if not the only — cause is the same as that which forms the ice on any pond, namely, the cold of winter. The cold air of winter sinks into the cave, and in course of time freezes up all the water which finds its way in, in the shape of melting snow or cold winter rain or from springs; and once ice is formed it remains long after ice in the surrounding open has melted away, because heat penetrates with difficulty into the cave.

The best proof, to my mind, of the truth of this view is the fact that no ice caves have been found in any place where, during part of the year at least, the temperatures of the surrounding country do not fall below freezing point; and also that all observations by reliable observers show that the temperatures of ice caves vary — but in a much narrower thermometric scale — with those of the outside air; that these temperatures are lowest, and as a rule below freezing point, during the winter months; that they are highest, and as a rule above freezing point, during the summer months.

There are a certain number of places in the Appalachian mountains where subterranean ice occurs; still, most of the deposits are small and of little general interest to the tourist, although no less interesting than larger ones to the scientist studying the phenomena of subterranean ice. In the Central European ranges, *per contra*, there are a number of splendid ice caves, of which some are easily accessible, and any lover of nature may be confidently recommended to visit one or two of them.

As the conditions to be met in ice cave exploration are not quite the same as those found in high mountaineering, a few notes on outfit may not seem amiss. For any serious exploration, the mountaineer's standbys are requisite, — ice-axe, rope, and nailed boots, — with one addition, candles or torches. Plenty of wraps are imperative, as nothing could be better devised than an ice cave to lay the foundations for rheumatism. After a two or three hours' walk, in the hot sun, perhaps, one must face a sudden change of temperature ranging from a July morning to a January afternoon. Except the boots, every part of the outfit, including linings, should, of course, be of pure wool. In regard to instruments, it may be well to mention that all recent data about ice caves are in the metric system, so, to be abreast of the times, one should use centigrade thermometers and a measuring tape divided into metres.

My first acquaintance with large ice caves dates back to the 21st of September, 1880, when I visited the two on the Mont Parmelan near Annecy in Eastern France. They are not mentioned in Baedeker's account of the Parmelan, an omission showing how little ice caves have as yet been brought into general notice.

One of these caves, the Glacière de Haut-d'Aviernoz, is a huge pit cave, into which we climbed down by a long steep slope. The bottom of the cave was filled with an enormous mass of ice many metres in thickness. I feel sure of the great depth of the ice floor, for in one corner of the cave was a long narrow hole into which I could see downwards for many metres, until the sides, which were solid ice and perfectly vertical, vanished from sight into darkness.

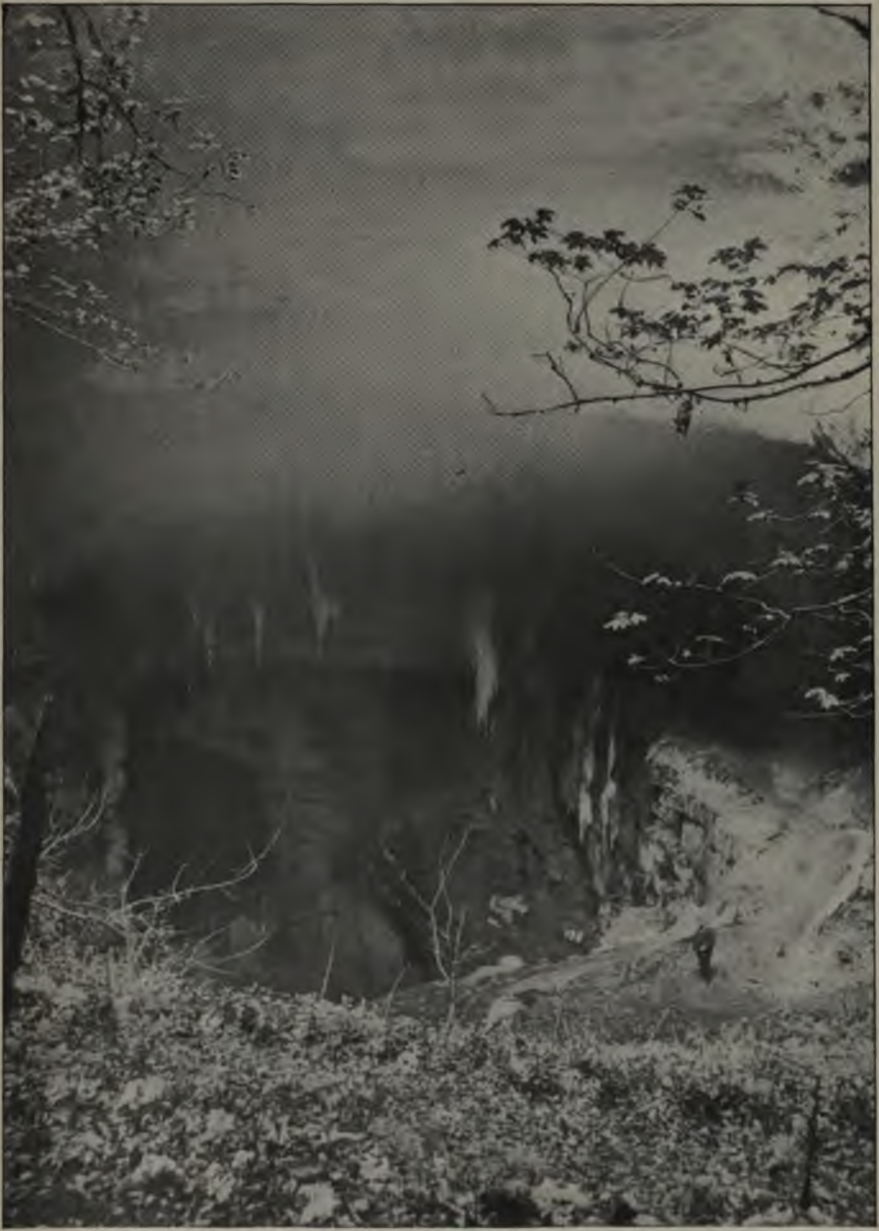
The other cave, the Glacière de Chapuis, was even more interesting. The entrance is in the side of a sloping cliff, and we had to do some mild chimney-work to reach it. Within the entrance was a perpendicular drop, down which we clambered with the help of the rope. Then a narrow descending fissure led straight into the mountain, and through this we climbed with some difficulty, finding that at the end it was divided into two contiguous chambers. One of these was filled with a lake of ice-cold water which barred further progress. The other had an ice floor, with seven or eight fissure columns streaming to it, which in the dim light of three candles loomed up round us like gigantic ghosts, the general effect — to my then unaccustomed eyes — being exceedingly weird.

There is another splendid ice cave in Eastern France, the Glacière de Chaux-les-Passavant, which is also called the Glacière de la Grâce-Dieu. It lies in the Jura, near Besançon, where one can stay in comfort at the Hôtel des Bains. The cave is a four and a half hours' carriage drive distant, over a splendid French road, across a picturesque country. A little restaurant has been built at the cave, where we had a fair *déjeuner*. An hour or more is needed for the visit to the cave, which does not present the slightest difficulty, the only absolute requisites being a winter overcoat, or its equivalent, and a walking-stick, and perhaps a few nails in one's boots. It is one of the pit caves, and a slope about one hundred and thirty metres long, and set at an angle of about 30°, leads to the bottom. We passed through a sort of rock portal, or arch, and found ourselves in a nearly circular cave some fifty metres in diameter and rising overhead for some twenty-seven metres. On the 18th of August, 1894, the entire floor was covered with a heavy ice sheet, on which rose some seven or eight ice stalagmites in the shape of rough cones, the largest of which could not have been less than six or seven metres in height. One of the columns had a large crack in one side, disclosing a young pine-tree, evidently planted in the ice to aid in the formation of the cone. In the crack the deep blue color of glacier crevasses was plainly visible. On one spot of the ice floor a little lake had formed, showing, in combination with the general sloppiness of the entire cave, that the ice was in a state of thaw, an emphatic proof that the ice in this cave does not form in summer. The whole effect of the cave with its ice cones was really grand and strange.

In the neighborhood of Geneva there are several ice caves, of which I have seen only one, the Glacière de la Genollière. It lies in the Jura, back of Nyon, and the excursion can be made in one day from Geneva. It is, however, of little general interest, as it is quite small, but if visited, the early summer is the best time. When I was there on the 11th of August, 1896, almost all the ice had been taken out by the owners of the neighboring châlet to help in the operation of butter making.

The Schafloch is a grand ice cave, in the very heart of Switzerland. It lies to the north of the Lake of Thun, up the Justizthal. I visited it on the 15th of August, 1895, with Emil von Almen of Interlaken, and it took us just three hours on foot to reach it from the little boat station of Merlingen. The last hour was up a steep and somewhat difficult slope, perhaps a little harder than the path up Tuckerman's Ravine. The cave is at the base of perpendicular cliffs, and enters the mountain for some two hundred and fifty metres with a steady down slope. At first we had to pick our way carefully among fallen limestone blocks, but after about seventy-five metres we began to find ice, which soon covered the entire floor, while great icicles hung from the roof. There were several ice cones, one of which was at least six metres high and hollow inside. My guide lighted a Bengal fire in this cone, and the effect of the rosy pillar of ice was very striking. Beyond the cone, the ice floor steepens and forms a grand ice slope, on which it was necessary to cut a few steps and where we roped. As it was pitch dark at this spot, we descended the slope, torch in hand, the incident forming a fascinating little bit of mountaineering reversed.

Crossing the Austrian frontier into the Eastern Alps, another large ice cave is the Kolowratshöhle near Salzburg. We left that place in the early morning of the 2d of August, 1895, with a guide in full Tyrolese dress with gray *jacke* and black chamois knee breeches. An hour's drive took us to the base of the Untersberg, on which the cave is situated, and three



GLACIERE DE CHAUX-LES-PASSAVANT.
From a photograph by E. Mauvilliers.

hours on foot up a rough steep path took us to the mouth of the cave. We then had to descend a sharp slope of snow, mud, and rock, some thirty metres long, and it would have been difficult were it not that the Deutscher und Oesterreichischer Alpenverein has had an iron hand-rail affixed to the rocks. At the bottom of the slope we stood on the lowest point of the ice floor, and facing us was a magnificent ice slope which flowed in two huge waves from the innermost point of the cave. At the base of the slope, to the left hand, was a great ice basin, filled with greenish water and cut by the drip; and it seemed not impossible that this basin in winter takes the form of a cone.

Still more to the east, in the so-called Northern Limestone Alps, is the Frauenmauerhöhle, near the curious mining town of Eisenerz, where the hotels are wretched. The cave itself is perfectly easy to explore; it goes clean through the mountain, and the ice is found in a sort of side pocket, in the shape of a nearly level ice floor, with two deep holes in it, and with ice columns streaming to it. When I was there on the 9th of July, 1896, the innermost end of the ice floor was covered with water. My guide insisted that this froze later in the summer, and he therefore argued that the cave was coldest at that time. The explanation is probably that this water is an accumulation from rains in the early summer, and that later in the year it drains off, leaving the ice underneath bare.

The great cave of Demenyfálva lies in the Carpathians near the railroad station of Liptós Szt Miklós. I went there from Vienna on the 12th of June, 1896, and found the railroad journey most entertaining, passing over the Hungarian plains, and seeing many natives in their national dress. Unfortunately, the hotel at Liptós was vile, and the road to the cave resembled nothing so much as the bed of a mountain brook, over which, in a carriage innocent of paint or springs, amid rain and fog, we went bumping along until every bone in my body felt sore from the jarring.

The cave itself is splendid, and consists of two stories. The approach is down a rock pit or well, where we got a beautiful moonlight color effect on our return from the darkness. Most of the ice was in the lower story, in the shape of a frozen lake, with pyramids and columns. There are two openings to the lower cave, and through the one farthest in a great ice slope flowed from the upper cave to the lower one. Up this my guide cut a staircase, and on reaching the top stood waving his torch to show me the beauties of his cave. Demenyfálva is certainly one of the finest ice caves in Europe, but to reach it at present involves some genuine discomfort.

A little farther east than Liptós, on the same railroad, is the little station of Poprád, which is situated just south of the row of sharp peaks known as the Tátra chain. Poprád may be reached in one day by rail from either Breslau, Vienna, or Buda-Pesth, and is the best starting point — as the Hotel Tátra is fairly good — for the great cave of Dobsina, which is a four hours' carriage drive distant, over a good road. It was a disappointment to me, on arriving at the cave on the 27th of July, 1895, to find that I should have to be one of a party of tourists, and, despite the great size and beauty of the cave, the fact that I had to think of it as a show place rather detracted from the pleasure. Around the entrance is a fence with a gate, and here the Dobsina people, who have established a high tariff, take toll from foreigners.

Pulling on sweaters and overcoats, we passed through the rock arch forming the entrance, and immediately found ice coating the rocks and a temperature near freezing point. Descending by a wooden staircase furnished with a hand-rail, we found ourselves in a huge cave, the floor solid ice, the roof covered with frost crystals, and with a number of great ice columns streaming from the roof to the floor. It was lighted by electric light, and this, catching the facets of the ice crystals on the roof and shining through the columns, gave the cave the appearance of a fairy palace lined with frosted silver.

The ice floor abuts against the rock wall all around except in two places, where there are openings. Through one of these we descended by another wooden staircase to lower levels, returning by a similar one through the other opening. At the bottom is the "Corridor," formed by the rock wall on one side and by the ice mass of the cave on the other. This "Corridor" extends all around the base of the ice, and we followed it for a distance of something over two hundred metres. In one place the ice has filled up the entire Corridor, and here a tunnel some ten metres long has been cut and has to be constantly kept open. The ice wall the rest of the way is nearly perpendicular, and I would estimate its height at not less than fifteen metres.

In conclusion, I would say that these few brief notes are offered to my fellow Appalachians with the hope of awakening their interest in ice cave exploration, and I feel sure that any of them who may be in the neighborhood of the great ice caves of Central Europe will be amply repaid if they will devote some little time and energy to visiting them.

The First Ascent of Rogers Peak.

By George T. Little.

Some one has rather unkindly remarked that a complete directory of the present and past officials of the Canadian Pacific Railway could be compiled from the names of the peaks along its line. Though admiration for the enterprise of the projectors and managers of this great highway may have had undue influence on the nomenclature of the region, no one who has passed through the magnificent defile in the Selkirks will question the appropriateness of naming both it and the chief mountain on its northern side in honor of the discoverer.[1]

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[1] Albert B. Rogers, whose indomitable will led, in 1883, to the discovery of a practicable route through the second of the three ranges that separated the settlements of British Columbia from the rest of the Dominion, was born in Orleans, Mass., on May 28, 1829. His boyhood was spent in Maine. He was prepared at Providence, R. I., for the Sheffield Scientific School, was graduated at Yale College as Ph. B. in 1853, and served there a year as assistant in engineering. He was then successively engaged on the enlargement of the Erie Canal, the construction of various lines of the Chicago, Milwaukee, and St. Paul Railway, the Minneapolis and St. Louis Railway, and the Hastings and Dakota Railway. From 1881 to 1885, he was in charge of the Mountain Division of the Canadian Pacific Railway. In consideration of his arduous duties in exploring, and the success that crowned them, he was presented with a purse of $5000 by the directors in January, 1884. In 1886-87, he was again engaged in seeking a railroad location in Montana and Wyoming. After a long illness, he died 4 May, 1889, at Waterville, Minn., of cancer of the stomach. He was a valued member of the American So-

Major Rogers was a railroad engineer. His various explorations within as well as without the United States gained him the title of "Railway Pathfinder." To ascend his peak without at all using his path would be a bad omen. Accordingly, Messrs. P. S. Abbot, C. S. Thompson, and the writer began the climb by stepping upon a hand-car at the Glacier House Thursday morning, July 30, 1896. The first two miles to the summit of the pass were surmounted by the laborious efforts of the Italian section hands, who enjoyed a well earned rest as the car hastened down toward Rogers Pass Station at a rapid rate. Before reaching it, we alighted, for our leader, Mr. Abbot, had chosen a way to the snow-line decidedly to the west of that pursued the previous year. We thus avoided either a large tract of burnt timber or a "face-scratching and skin-scraping scramble" up the bed of the brook.[1]

After a brief struggle with the logs and briars of an acre of fallen timber, girt about with devil's-club, there came a long, delightful hour of steady climbing through a typical Selkirk forest. One must experience to understand the pleasing gloom of such a forest on a summer's day. It is lighted by the few rays that find their way between the foliage of the tall pines and spruces, and that of the less lofty deciduous trees which flourish by their side. Occasionally the conifers claim all the ground and cover every depression between the moss-covered ledges and boulders with a thick carpet of needles. Before we reached the tree-line, we crossed the track of the foe of all sylvan beauty, the forest fire, and on passing out of his desolate domain came into that of the avalanche and glacier.

The first formal halt and lunch was at a bit of verdure on the flank of Grizzly, where our course, as marked on the accompanying illustration, turns to the right. Here the flower-

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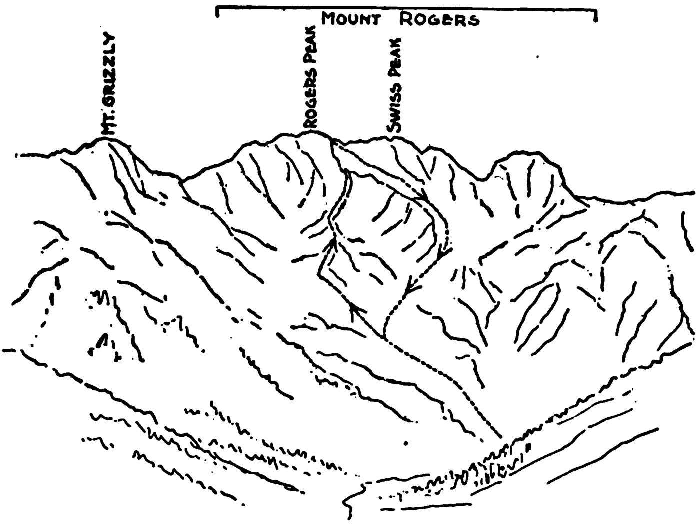
ciety of Civil Engineers, and won the title of major in service against the Indians in 1862.

[1] The party of the previous year, composed of Messrs. C. E. Fay, P. S. Abbot, and P. B. Field, entered the woods directly opposite the station, — apparently following the course taken by Herr Carl Sulzer in 1890, — climbed round the spur of Hermit, and met with much burnt timber. After reaching the glacier they were obliged to turn back on account of the illness of one of their number. The opportunity to visit the beautiful waterfall some sixty feet in height, visible from the Glacier House, rewarded their descent by the way of the brook, which was exceedingly rough.

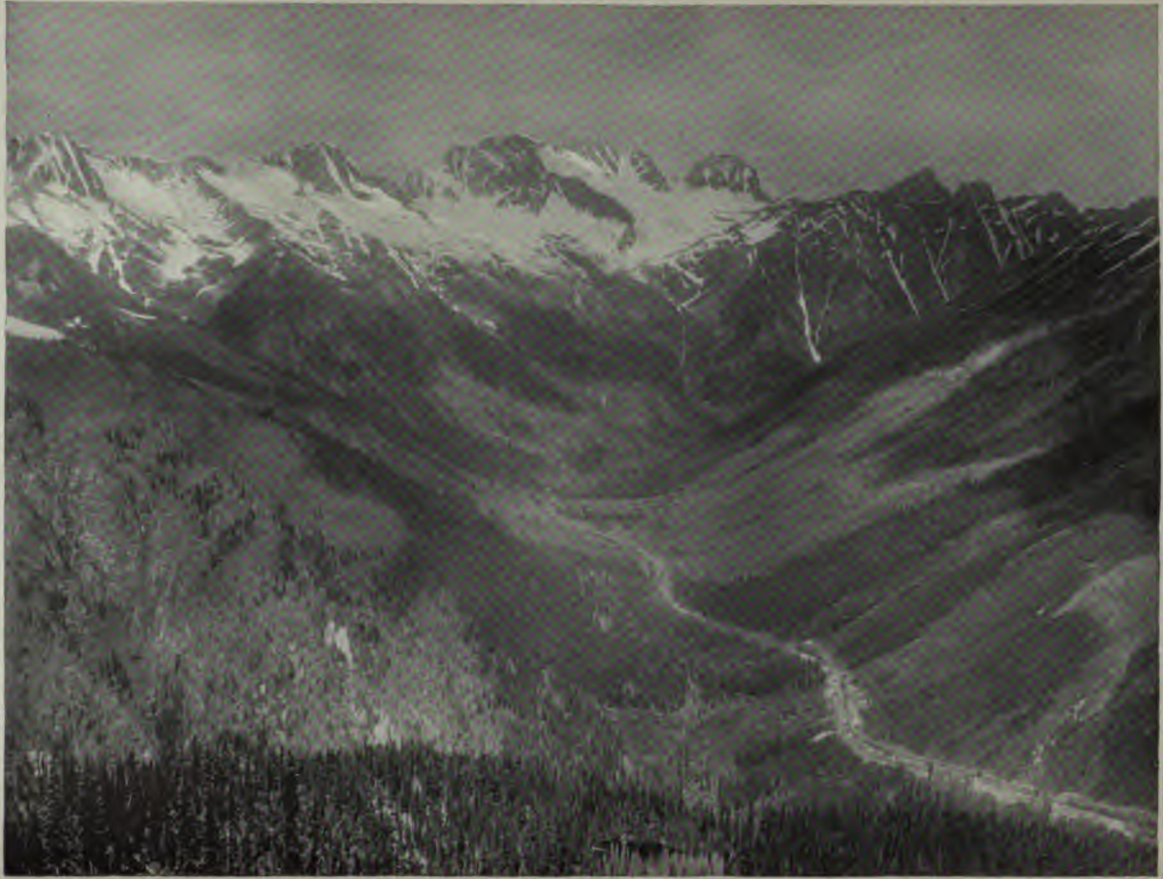
strewn turf, the playground of several sprightly marmots, traversed by numerous rills from a snow-fed brook, formed a striking contrast with the barren rock ridges that lay on either hand, and especially with the shrunken Grizzly glacier, not far beyond, with its irregular moraines, a symbol of lingering death drawing back from the grave it had dug itself. To the south in the foreground extended the Illicilliwaet valley, with the winding railroad and the Glacier House with its lawn, — the only objects to remind one of man and his handiwork. Beyond rose the southward continuation of the snow-covered range of the Selkirks, marked near this end with the sightly spire of Sir Donald, and disappearing in peaks that clustered in the haze. Here and there the gleam of snow or ice could be traced down a radiating valley, growing more noticeable as the forests of the lower levels closed over it.



Remembering the anemones and columbines, the caltha and painted cup of the grassy resting-place, the novice of the party was astounded ten minutes later to be told that what he supposed must be stains from a wounded marmot was the "red snow" of arctic travellers. Childhood's imagination had made this one of the great wonders of the polar world, and he momentarily felt a sensation of pride and importance akin to that which comes to him who can claim "farthest north."

The rope was now put on, and the glacier and the adjacent névé were crossed diagonally to a minor arête, marked in Plate XXXV. by the triangular patch of snow lying on its right. Delays incident to the irregular surface of the glacier and to frequent use of the camera — unfortunately the films played a not uncommon trick, and the results were worthless — prevented our reaching this point till nearly noon. The July sun had done its work on a slope exposed, as was this, to its direct rays, and our leader, though disappointed, turned with cheerful determination to the rocks and scree-filled gullies. The slope was broad, and the danger of dislodging loose stones led each to pursue a separate course. Stimulated by the sense of freedom that came with the laying aside of the rope, and not unwilling to show my comrades that I could reach the main ridge as soon as they, I directed my own steps more to the left towards a crag as huge as it was sharp. This rock seemed to me in the direct line of ascent, and would, I believed, afford an unobstructed view of the way. It did reveal a view — but not what I had expected. Once on top, I found that I had devoted fifteen minutes to climbing a "gendarme," standing at an reëntrant angle on the mountain side, and that, in front as well as at my side, was a chasm of several hundred feet. Startled at the nearness and sheerness of the precipice on that side, I henceforth kept more closely to my companions.

After a laborious hour we sat down together on the main arête for a few moments' rest. Swiss Peak was full in view, and across the intervening steep snow slope, the cairn raised on its farthest summit by Herr Sulzer, in 1890, was plainly visible. We had reached this slope above the yawning bergschrund that we had studied with our field glasses on the piazza of the Glacier House and had dreaded as an obstacle. But, on examination, our cautious leader deemed the softness of the snow too suggestive of avalanches to warrant any attempt to plod steadily up the slope to the summit. We must keep to the rocks. The scree had disappeared. The boulders had grown larger and coalesced into ledges tilted at unpleasant and varying angles. At least one place could be called diffi-



MOUNT ROGERS, HERMIT RANGE, SELKIRK'S.

cult. The only thoroughfare was over a smooth ledge inclining at an angle of sixty degrees and nearly as many feet above the snow. There was no foothold save a transverse crack along its upper side, just beyond one's reach without the help of an ice-axe or a friendly hand. While drawing himself up to this, one of our number was seized with a severe cramp which we for a moment feared might prove to be a strain. It is needless to add that we walked this crack with deliberation. Twice we crawled through or under the great fragments of rock which the giant hands of heat and cold had tumbled one upon another, rather than run the risk of surmounting or flanking them. Three hours of such clambering interrupted by a second lunch and a long rest brought us to the summit.

The sense of fatigue disappeared with the sight that greeted us. We had crossed the rock-rib that joins Rogers Peak to Swiss Peak and justifies Herr Sulzer's use of Mount Rogers as an inclusive term, and were now standing on the snow that covers the crest of the mountain like a thick fold of flesh. Mr. Abbot called me to its northern edge, saying, "Look down and see what I have never seen before in Europe or America." The sight was a wall of snow at least fifteen hundred feet in height that seemed perpendicular[1] as we cautiously peered over. From its base a glacier swept away over an ice fall, marked by huge irregular séracs into the valley beyond.[2] To us, toiling for hours over blackened rocks, this sudden transformation of the peak into pure untrodden snow rising from a foundation of glistening ice was as startling as it was beautiful.

The haze shut off the distant view to the north and west, but as far as the eye could reach, sharp rock ridges peering through the mantle of snow contrasted with the forest-clad valley of the Illicilliwaet, so prominent in the other direction. Near at hand rose the northern face of Grizzly, from this point a perfect cone of gray ice unspotted with rock. The moment of disappointment came when the aneroid barometer was consulted. In his sketch map[1] of this region Herr Sulzer estimates our peak to be ten metres higher than Sir Donald. We hoped for this amount of evidence that in point of altitude we had surpassed the Swiss party's brilliant ascents in the Selkirks. Despite a vigorous shaking our instrument stood fast at 10,300 feet.[2] We were beneath rather than above the summit of the American Matterhorn. The hour, five o'clock, forbade a long stay on the summit, and the absence of material prevented the erection of a cairn to celebrate our ascent.

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[1] Subsequent measurements with the clinometer, taken at points several rods apart, showed that the snow wall had a slope of fifty-four degrees. Parallel with a lower rock ridge, and perhaps forty feet from the edge of the wall, ran a fissure through the undulating snow and ice of the summit. This circumstance led us to surmise that under the favoring circumstances of a long warm summer, this crack, now insignificant as to width, might develop into a bergschrund of no slight proportions.

[2] It will be found, I think, that we were overlooking the valley of Mountain Creek. At any rate, the following day as we crossed that stream, the fireman of the locomotive remarked, "Prospectors have been up that valley and have come out at Ross Peak," apparently showing that there is an easy pass across the range probably to the north and west of Mt. Cheops. An alpine problem presenting some difficulties would be the crossing of the range between Rogers Peak and Grizzly. C. S. T.

The first half of the descent proved as easy as the last half of the ascent had been difficult. The condition of the snow slope on the southeast had changed with the withdrawal of the sun's rays. Our leader now considered it a safe highway. A royal one it was. Its surface yielded sufficiently to enable one to press a firm foothold, and its inclination at an angle of forty degrees made all other exertion unnecessary. To stand erect on a slope like this, and thus secure the firmer footing, is a hard lesson for a novice to learn. The writer vividly remembers the frequent exhortation from his friend in the rear, "Don't lean in, jam your heel down."[3] But confidence in the ice-axe, in the rope, and most of all in one's comrades, is of rapid growth. By the time we reached the bergschrund, the tyro was quite ready to assent to the proposal to cross it in the "pleasant way" described by Professor Tyndall in his chapter on the "Accident on the Piz Morteratsch." Fortunately, his ignorance, though great, was surpassed by the wisdom of his fellows. A subsequent glance at the chasm from the lower side made us all content that the experiment of tobogganing across it was not tried. A considerable traverse, however, was necessary before we found a place where a long step brought us upon an icy ridge projecting from the lower side. This was covered with snow and so narrow that our leader insisted that we cross in horseback posture, working our bodies along a few inches at a time. Once beyond the schrund, the slope lessened, and, between running and glissading, seven o'clock found us in the amphitheatre formed by projecting ridges from Rogers and Swiss peaks.

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[1] Jahrbuch des Schweizer Alpen Club, 1890–1891, page 264.

[2] The aneroid, however, was slightly depressed that day, recording the elevation of the Glacier House a few feet lower than at other times. It may be added that the instrument responded well to that crucial test of an aneroid, ability to return promptly to the proper point on descending.

[3] The friend behind wishes to bear witness here that he considered Little, under the circumstances, a remarkably upright man. Not until we glissaded was it apparent what a remarkable backslider he could become. C. S. T.

Words cannot describe the glory of the scene we witnessed here. The day, which had not been especially fine, was ending with a gorgeous sunset. Its brilliant hues not only lit up the sky, but so poured over the snowy flank of Mt. Grizzly, that one could hardly say where earth ended and the heavens began. They played among the fantastic towers and minarets of Mt. Hermit, intensifying their nearness and exaggerating their odd shapes. Later came the afterglow, and the snow cornice on Grizzly gleamed like a monster reef all of pinkest coral. I agree with my companion Thompson: "It was literally more than supermundane, suggesting the jasper walls and golden streets of the apostle's vision."

The large crevasses that mark the turn and fall of the Rogers glacier into the valley were all well bridged. They were safely passed, and, though the light was now waning, after a few moments' examination of the channels in the snow, Mr. Abbot authorized a glissade of several hundred feet. It was a delightsome coast, but the consistency of the snow demanded the sitting rather than the standing posture. As a result, long after we unroped minute glacial rivulets continued to flow down our limbs to their haven in our shoes.

It was nearly ten o'clock[1] before we had crossed the depression cut with glacial streams and dike-like ridges, and plunged into the woods on the other side. The next four hours are not pleasant to recall. In a Selkirk forest the delicious gloom of the forenoon becomes Egyptian darkness at night. A chance remark from the novice that he would catch his death-cold, if he lay down to slumber with soaking feet, led our uncomplaining leader, who, unknown to us, was suffering from severe nausea, to abandon the thought of a bivouac, and to continue to pilot us down the mountain side, with frequent halts, but without the slightest mishap. A second battle with that abominable piece of fallen timber, a brief lounge on the station platform, the long four miles on the railroad, and then came the welcome sight of the Glacier House just as the eastern sky was brightening into a new day.

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[1] The last three hundred yards before reaching the railway were weird beyond description. We were in a maze of fallen trees, log piled on log, jackstraw-wise; underfoot, bog, running brook, and boulder; overhead, dense boughs of fir and spruce; around us, alders, devil's-club, and all the impediments of a Selkirk thicket. The moon crept over the top of Mt. Macdonald and spotted our wretched darkness with a distorted light. We were travellers struggling through an African jungle, adventurers seeking the palace of the sleeping beauty. C. S. T.

Per Aspera ad Astra.

PHILIP S. ABBOT.

Died August 3, 1896.

EASY and swift was the rough way to thee,
Dear boy, whose bright face to our older eyes
Seemed full of radiant dawning and sunrise,
Promise and pledge of a fair day to be;
Up the steep, icy slopes thy footsteps sped,
Which never foot had trodden before but thine,
And then, — obedient to some heavenly sign,
Some word of power which might not be gainsaid,
With hope undimmed, and eyes that knew no stain
Of tears, or shadow of remembered sin,
But glowed and shone from the brave heart within, —
Thou, without hesitance, or fear, or pain,
From off the mountain tops of thy desire
Leaped to the starward pathway and went higher.

SUSAN COOLIDGE.

An Ascent of Ross Peak.

By Charles S. Thompson.

The Canadian Pacific Railway passes from the eastern to the western slope of the Selkirk mountains in a double curve somewhat rudely resembling the letter S. At the end of the second curve — perhaps two and a half miles west of Glacier House — the railway, in order to regain the floor of the Illicilliwaet valley, which here drops rapidly toward the Columbia, turns upon itself in two gigantic loops, before resuming its normal course toward Revelstoke and the Pacific. Standing on the railway track at the beginning of these loops and looking westward, the eye follows upward a narrow forest-clad ridge, rising, beyond three rounded knobs or shoulders, into a perpendicular cliff shaped like the sole of an upturned shoe. The early railway engineers named this, perhaps after one of their number, Ross Peak.

About ten o'clock in the morning of Tuesday, July 29, our little party of last summer sat in Professor Fay's[1] hospital room at Glacier House vigorously, if silently, condemning to future reprobation the porter of our late sleeping-car between Minneapolis and Moose Jaw. That dusky official had been deputed to allow the light of the Queen's lanterns to fall among our humble belongings when we crossed the international boundary at Portal. A strange mental process on his part — I hesitate to call it laziness or stupidity — sent our baggage "in bond" to Calgary, an assured detention of twenty-four hours behind our arrival at Glacier. Our sole climbing-outfit that morning — over and beyond the customary impedimenta with which man ordinarily appears in civilized society — lay on the floor before us: an old pair of shoes, hobnailed, and two pairs of gymnasium slippers — in our vernacular, "sneakers," — one pair much worn. An expedition that day above the snow-line seemed quite impossible.

There was, however, opportunity for a training climb. I had long entertained designs against Ross Peak, partly because there were no traditions at Glacier House of an expedition in that direction, partly because its comparatively insignificant height (7616 feet) had resulted in its scornful rejection by my companion of 1893. Little suffered himself to be persuaded, and, accompanied by Abbot, we started leisurely westward for the second of the loop bridges. There, where our route changed from railway to forest, Abbot left us, ostensibly fearing the laming effect of borrowed sneakers, — actually, I am convinced, that we might work out unaided our own solution of this minor problem.

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[1] He was convalescing from an injury received on the safe summit of Mt. Chocorua some weeks before, and so did not participate in our last season's training climbs in the Selkirks.

For two hours we tramped up the wooded ridge, a delightful climb quite unimagined by those accustomed to long, suffering scrambles through the undergrowth of our Eastern mountains. The warm valley wind, cooled by the dense shadows of the overarching spruce and fir, was scented with the resinous odor of the evergreens and heavy with the moist, earthy odor of forest mould. Across the summit of the ridge southward we caught between the tree trunks glimpses of Mt. Bonney and the glaciers of Lily Pass. Then on the top of the second shoulder, passing beyond the tree-line, we came upon a beautiful alpine garden colored with anemones and columbines.[1] Here, by the side of a snow patch that gave our only drink, we ate what lunch we had, sweet chocolate and preserved ginger, each according to his taste.

Our first impression was one of dismay. Beyond the third shoulder, rising at the farther edge of the alpine garden like a petrified melon, beyond the foot-shaped cliff, now dwarfed in comparison, towered a twin rock peak unquestionably dominating the ridge. It was evident that we could not climb it in our shortening afternoon. For the moment it was not equally so evident that it might not prove, on further investigation, to be Ross Peak.[2] Moreover, our premeditated summit was by no means clearly in hand; so between the meagreness of our meal and a desire to know what lay before us, we were soon scrambling among the edge-protruding, grass-interspersed ledges of the third shoulder.

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[1] My companion remarked upon the profusion of wild flowers, especially on the western slope of the mountain. He remembers noticing the following: —

Yellow lilies (*Erythronium minor*).
Painted cup (*Castileia miniata*).
Stone crop (*Sedum stenopetalum*).
Western anemone (*Anemone occidentalis*).
Yellow columbine (*Aquilegia flavescens*).
Moss pink (*Phlox douglasii*).
Purple daisy (*Erigeron macranthus*).
Mountain avens (*Dryas octapetala*).

[2] There is no question but that we climbed Ross Peak. Its location upon

At the top our ridge narrowed to a knife-edge. On the left toward the Valley of the Loops the rock dropped three thousand feet in a magnificent slope of sixty degrees, bare of all vegetation, smooth as if cut with a chisel. On the right westward the slope, broken irregularly into narrow shelves by the inward dip of less worn strata, fell perhaps eight hundred feet into a U-shaped snow-filled valley, lying between a second ridge running from the twin peak and the ridge on which we stood. Our homeward route was to take us into that valley.

We were now at the northern foot of our peak. It would have been possible, I suppose, to have ascended it by the northwestern arête, a steep rock climb favored by the inclination of the ledges. But a traverse along these same ledges to the southwestern arête seemed easier, and by that arête over boulder heaps we found ourselves upon the summit.

The next three quarters of an hour is the shortest of which I have any knowledge. Little immediately seated himself among the softest boulders, and thence aided (orally) in the construction of a small cairn supporting vertically a weather-worn bark-stripped staff which I had found upon the knife-edge at the foot of the southwestern arête.[1] Then, diligence being largely its own reward, I joined my companion in his arduous occupation of holding down the boulders.

Green's map, the trigonometric height given it by the engineers (our aneroid that day read 7700 feet), and a comparison with some original drawings by Mr. Green, which he kindly loaned me this winter, settle that question. The clerk at Glacier House, in answer to my query, stated that Ross Peak was the cliff seen from the loop bridges, "but some people call the whole mountain as seen from the snow sheds Ross Peak." This error has arisen because Notman calls his view of the mountain mass Ross Peak. The higher twin-peak, which gives form to the whole, *has no name.*

[1] The finding of the staff so far above the line and bearing evidence of use at its smaller end is good evidence that the peak had been previously climbed, perhaps by the men who named it. Found in the col between Ross Peak and the wave-like eminence but a few steps below the summit, it shows we followed exactly their plan of ascent. It is interesting to note that it was in a position from which it might easily have been blown by a high wind into either valley, thus being a silent witness to the comparative freedom of these heights from strong winds, at least between snow melting and snow coming.

The view southward, distinctly the most imposing, suggested the view from Mt. Franklin toward Mt. Washington along the Crawford trail. In this suggestion a nameless wave-like eminence, equalling our own in height, represented Monroe; the twin peak, a magnified, most impressive Washington. But the ridge was narrower, the slopes alpine in abruptness, and the white glaciers on Mt. Bonney, reaching below us, reminded us that we were even now above the snow-line. Yet the wind was soft and warm, bringing in the pure physical enjoyment of our surroundings a forgetfulness of all below. Little's voice was less melodious than a rising-bell when it announced, "Four o'clock, and time to go!"

My revenge came later. Persuading him in the interest of our Councillor of Exploration to descend into the western valley, we were, after a somewhat intermittent descent, confronted with a considerably steeper snow slope than we had anticipated from above. Gymnasium slippers, admirably adapted to rocks, are hardly desirable footing upon a snow slope, especially upon a snow slope cut almost into the figure 8 by two projecting reefs. Mindful of the hurried descent of a worthy gentleman, even then president *in petto* of our Club, under somewhat similar circumstances, the preceding summer, we advanced in a fashion comparable to that of the snail in its daring and rapidity. Below the reefs we tried the sitting glissade, not here to be recommended, as Little will abundantly testify, owing to lumps of ice protruding through the softer snow. Of our descent beyond I have no distinct recollection.[1] I remember that my tendons of Achilles were sore from the chafing of the sneakers, that I was wildly hungry, and that it was getting dark. I know that we came upon the railway at the point where we left it in the morning, and that Abbot met us in the twilight and walked back with us to Glacier House.

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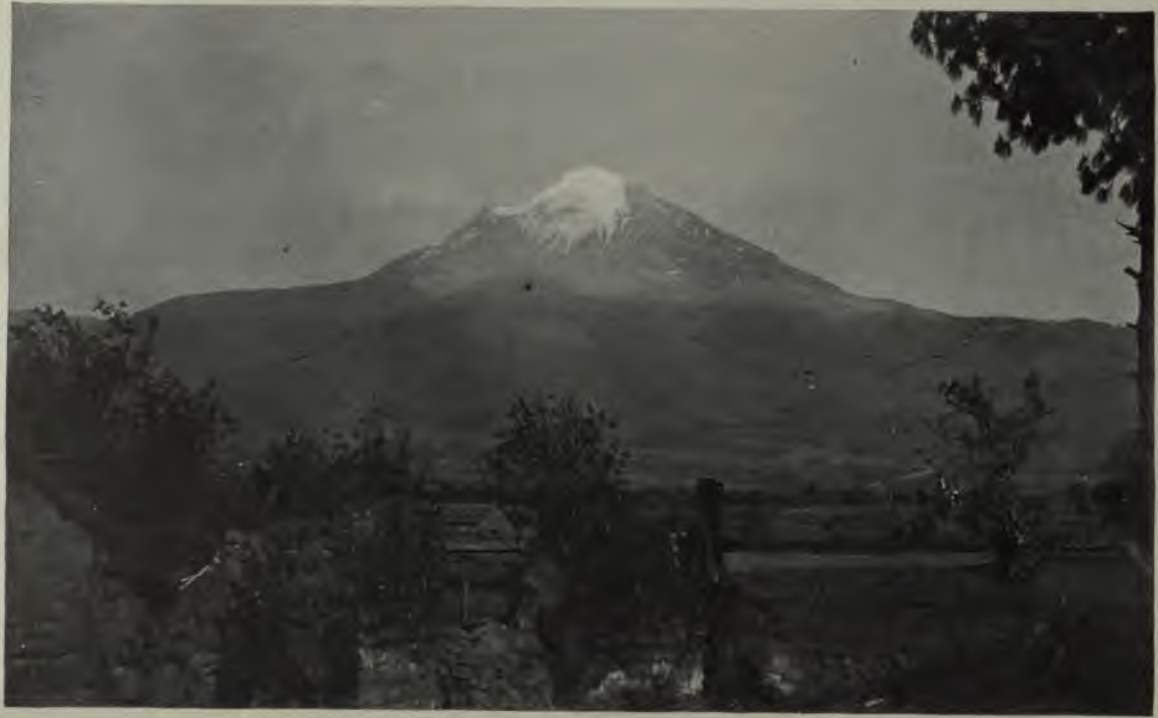
[1] It is due to Little to publish his comment upon reading this sentence: "This is delicious. After enticing a novice down the other side of the mountain as a duty to the Councillor of Exploration, and allowing him to kick with his heels steps in a half mile of snow slope as a duty to his companion, my friend has 'no distinct recollection' of the 'descent beyond.' I have. It took fully two hours of hard walking to make the traverse back to the ridge by which we ascended. We were just below the tree-line, and on many New England mountains such a circuit would have been impracticable, or would have consumed an entire day."



POPOCATEPETL FROM THE WEST (AMECAMECA).

An Ascent of Popocatepetl.

By A. E. Douglass.

Read June 9, 1897.

An expedition, consisting of Mr. W. A. Cogshall and the writer, accompanied part way by Dr. T. J. J. See and his brother, who went for a brief outing in the mountains, left Mexico for the ascent of the great volcano on April 12 of this year. Horses and mules were procured at Amecameca, and the fourteen-mile ride from there to the sulphur-smelting works, at a locality called Tlamacas, at the foot of the mountain, was made in five hours, from 2 to 7 P. M. This is an ascent from 8200 feet (2532 metres) to 12,900 feet (3937 metres), but no one experienced any marked inconvenience from the altitude, although the increasing cold after nightfall became very disagreeable. Very little was eaten by us that night or the next morning, to avoid the indigestion which high elevation is apt to bring on.

We left Tlamacas at 5 A. M., on horseback, and at 6.30 reached Las Cruces, at an altitude of about 14,000 feet, whence we proceeded on foot, as is customary. The path is on the northern slope of the cone, and at the time of our trip was but a short distance east of a large field of ice and snow impossible to traverse. On the entire ascent to the crater no snow was encountered, although in some places there were traces of it under the sand, lending to the latter its solidity, and greatly helping us. Mr. Cogshall reached the crater in 4 h. 10 m. from the time he left Las Cruces. I was longer, taking fully 4 h. 50 m. Frequent rests were necessary to regain breath and allow the pulse to quiet down. An attempt to climb more quickly brought on a very disagreeable but temporary feeling of exhaustion and inability to climb higher. One should be very careful of this, and, on the first sensation of overdoing, rest until entirely relieved, and then go more slowly.[1] Timing one's self with a watch, taking twenty or thirty steps, and then resting one minute, is the correct way to make a climb of such magnitude at high altitudes.

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[1] One week after writing the above I tried the ascent of a still higher mountain, and failed to reach the top from disregarding this very caution.

The view of the crater is strikingly sudden. When I was approaching it without, however, seeing any signs, my guide, who carried the barometer and camera, and was always beside me, kept offering encouragement, and finally pointed to a bit of stone some two hundred feet ahead, and said the crater was there. So it proved. On reaching that spot the slope, without warning, rounded over, became level, and descended precipitously into a huge pit, and the strong smell of sulphur showed its volcanic character. The pit is fully two thousand feet across and probably more than a thousand feet deep. Its sides are perpendicular, exhibiting the non-conforming layers of successive lava streams, with here and there, especially on the near side, boulders and cliffs of basalt. Around the edge at the bottom the heaps of talus are small, suggesting recent activity, while the floor is of a yellowish tint, showing half a dozen bright yellow spots whence sulphur and vapor are ascending. In the centre there is a large pond whose water is a brilliant green in color.

The ridge surrounding the crater is serrated, broken into peaks and hollows. The approach is at the lowest point and is upon a ridge formed by a long curved sweep of volcanic sand. The highest point is nearly opposite, and some six hundred feet higher.

One's honor is vindicated on reaching the crater; but having with us a mercurial barometer, through the kindness of Señor Zendejas, Sub-Director of the Central Meteorological Observatory of Mexico, it became necessary to push on as far as possible toward the highest point. A pole was visible on a small peak of the western wall of the crater, which some one had placed there "because he wanted to," — "*por gusto*," the guide told us. Without expecting to go beyond the pole, I set out with one guide and reached it in half an hour. Thence the way to the summit was in plain view and was obviously difficult. In the mean time, another guide came to help in the attempt, and, incidentally, to accept an extra fee, and we set out after discarding everything not absolutely necessary.

At first the ascent was not steep, but was in a measure dangerous, if one did not have a good head for high places. The rock

WESTERN CLIFFS OF CRATER.

ICE FIELD NEAR SUMMIT, POPOCATEPETL.

was a soft, crumbling lava, which projected in a series of slightly inclined knife-edges out over the crater, presenting, as we progressed, on our left hand a precipice of a thousand feet, and on our right a sharp descent into deep ice caves. Passing this, a steep narrow ridge of sand led straight to the summit.

The summit is worthy of the mountain. Although composed of sand, it is hardly three feet across. Twenty feet on one side is the crater, and thirty feet away on the other the slope drops suddenly into the ice-sheet. To the south a great ridge of rock stands out conspicuously, and can be followed by the eye for thousands of feet downward. Far away to the north Ixtaccihuatl, of nearly equal height, mounts into the sky, and one seems to look across a grand cañon worn in some plateau, whose sole remaining points are these two mountain tops.

The air below was hazy, but above the haze a narrow strip of blue showed where the horizon was, — and how high it seemed in comparison with the nearer regions! At this hour of the previous day, between one and two o'clock of the afternoon, clouds had been upon the summit, so, to avoid being caught, the photographs were quickly taken and the barometer readings made, and we prepared to descend.

The ascent from the entrance of the crater to the summit had taken 1 h. 40 m. The descent, owing to the character of the way, required 30 m. After stopping a few minutes on the edge of the crater, we began the great descent at 2.30, and in exactly 30 m. reached Las Cruces. From there, still on foot, we arrived at the Ranch at 3.48, finding our companions ready for us with a lunch which, from exhaustion, we could hardly touch. Mr. Cogshall, always more robust, ate sandwiches for both of us. I drank a few swallows of wine and ate a small piece of sweet chocolate. The chocolate, the wine, a few swallows of beef-tea, and a little water were all that passed my lips from the time of leaving Amecameca to the return thither.

At half past four we set out for Amecameca, and reached there in four hours, passing through a steeper and more picturesque road than the day before. We were indeed grateful for the good supper and comfortable beds of its pretty little hotel.

The barometer readings at the top of Popocatepetl were 15.897 and 15.864 inches, reduced to freezing (403.8 and 403.0 millimetres, respectively), and the standard thermometer registered a temperature of 32.7° F. (0.4° C.). When compared with readings at Mexico at one and two o'clock, they gave an altitude for the mountain of 17,775 feet (5418 metres. This is the result by the Smithsonian Tables of 1893; by certain French Tables of a less recent date the result is 17,721 feet, or 5401 metres).

It seems to the writer that during the winter season very valuable series of meteorological observations might be carried on at the top of this mountain. It would then be decidedly the highest in the northern hemisphere and the second highest station in the world, the highest being on El Misti, at Arequipa, Peru, at an altitude of over 19,000 feet (5800 metres), to whose top, by the way, the observer regularly ascends on mule-back. It would do for this hemisphere what the El Misti station is doing for the southern.

The ascent is inexpensive, both in time and money. We were absent exactly forty-eight hours from the city of Mexico, and our entire expenses reached only nine dollars (gold) for each man. General Ochoa, residing at the Hotel Iturbide, in Mexico, is the owner of the mountain and of the sulphur deposits in the crater, and we were indebted to his courtesy for a note of recommendation to his manager in Amecameca.

For the physical exertion of climbing, the atmosphere we encountered was particularly well adapted. The sky was hazy, cutting off the fiercest rays of the sun, and the air was quiet, so that we did not suffer from cold. It was also especially favorable for obtaining the altitude; for, so far as could be judged by signs, the air was without irregularities in density between the top of the mountain and the city of Mexico. The sheet of thin cloud was far above the top of the mountain, and there were no cloud levels below it. The wind was light, both in the city and on the mountain, and the absence of direct sunlight prevented any local convectional action which might alter the barometric readings. These facts compensated to some extent for the loss, which we greatly felt, of the marvellous view of the table-land of Mexico.

La Ventana.

By J. W. Toumey.

Read January 13, 1897.

The Santa Catalina Mountains are a series of bold, picturesque ranges of ragged peaks, which break from the Tucson plains some half score or more miles north of the old pueblo of Tucson. They are for the most part barren and gray, with now and then a giant cactus, cholla, nopal, or palo verde covering in places the nakedness of the lower ranges and rock-bound sides of their more sturdy neighbors. Oaks and junipers occasionally get a foothold in some half-hidden crevice, while the summits of the higher mountains and many feet down their northern slopes are well covered with pine and fir.

Of the many mountains of the Southwest, the Santa Catalinas are the most pleasing and impressive. Of the many ranges which hem in this ancient city, they are the first to attract the stranger, and the last to claim his attention when he departs.

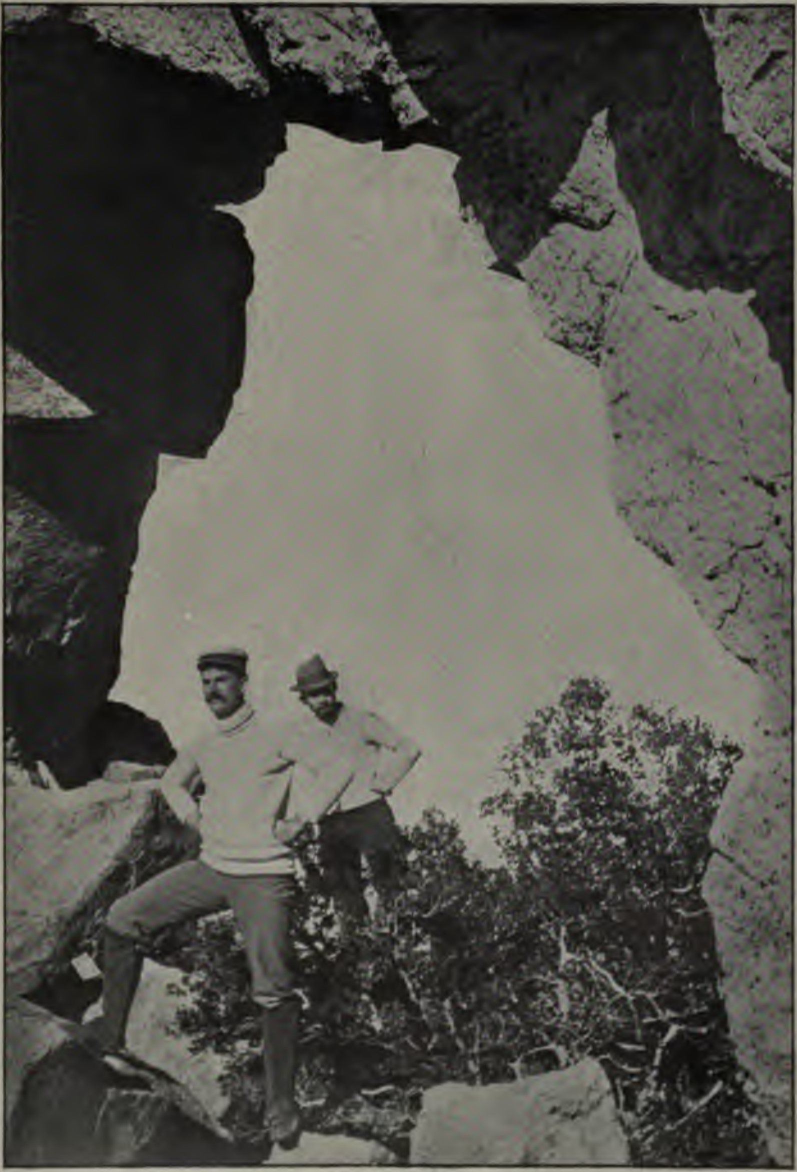
Time, little aided by frost and rain, has worked with a slow hand in levelling these rough barriers. Perpendicular cliffs, great flat walls, sharp ridges, and jagged peaks are to-day almost as they were when Nature first chiselled them from the original granite. The ragged outline against the blue sky presents almost as many variations and forms as the glowing embers in an open grate. One high white cliff is known as Castle Rock, and farther to the east is a series of long slender precipitous points crowning the summit of a sharp ridge which rises three thousand feet above the plains. This group of granite columns constitute "the Needles," while to one side rises a solitary point known as "the Finger." A dozen or more miles beyond, and from Tucson just visible over the tops of the intervening ranges, rises the dome-like summit of Mt. Lemmon, the highest point in the Santa Catalinas. This mountain reaches an elevation of some ten thousand feet, or nearly seven thousand feet above the plains.

The semiparallel ranges which constitute these mountains extend nearly east and west, and are some fifty miles in length, while the width of the entire series is nearly as great. The southern slope, or that portion in view from Tucson, is rugged in the extreme. Even the cacti, hardy yuccas, and Spanish daggers struggle hard to gain a foothold on the barren rocks. Many deep cañons, with overhanging cliffs and high intervening ridges, cut the morning and afternoon shadows into multitudes of forms, which are tinted by the last rays of the setting sun with the most delicate and pleasing shades of violet and purple.

To one not familiar with an arid region, with its soft, balmy atmosphere and clear blue sky, it is not possible to portray the richness of its sky colorings, with its multitudes of harmonious shades and tints which usher the sun behind the western hills and wrap the whole heavens in warm soft colors which gradually steal into darkness. The sky lends her tints to the distant mountains, and the gray peaks are warmed and softened by them as the sun disappears. In a few moments the colors vanish, and in the growing night the rugged outline is silhouetted against the sky.

From early November until late spring the cañons are made gay by the splash and hurry of mountain streams, which are born among the snow crowning the summits of the higher ranges, and which sometimes comes half way down the mountain side, only to be soon chased by the hot sun back to the shaded nooks and crevices at the summit. Cataracts, cascades, and rapids characterize nearly every portion of these cañons. Tiny streams no larger than one's wrist spill themselves over great granite boulders and disappear as fine spray, or form long icicles and broad sheds of ice which glisten and sparkle in the sunlight. Other streams, swollen to the size of small rivers, rush and tumble over the rocks, scooping out great basins in the solid granite, rolling and tossing about heavy boulders, grinding, foaming, and churning in their hurry to get down the cañon, only to lose themselves in the sands of the desert before they are fairly beyond the shadow of the mountains.

Two companion cliffs arise from among the pines and junipers of the second range, and stand out white and precipitous just beyond and a little to the right of a high, round-topped, bush-covered mountain of the first. Fairly in the centre of the lower of these cliffs is the Ventana, through which, at a distance of nearly twenty miles, a patch of blue sky may be



LA VENTANA (THE WINDOW), ARIZONA.

seen on any bright morning. The Ventana has for years been a curious and interesting feature of these rugged mountains, and has often been pointed out to strangers from the veranda of the San Xavier Hotel. Although of considerable interest, no one seemed to have determined whether there was a hole through the cliff, or a like effect produced by two high overhanging rocks, one superimposed upon the other. The latter explanation seemed to be the more popular one. A by no means small part of the popular belief was probably gained by the tales told by old-timers who have been here ever since Arizona became part of the Union. These old fellows like to pose as knowing every nook and corner of Arizona's 114,000 square miles of territory, while in fact they sat down in Tucson forty odd years ago and have not been out of sight of the old pueblo since. It was the assertion of one that the Ventana was not a hole but a saddle between two cliffs; and, further, that he had years before ridden his horse through it. The patriarch of the town had at one time sent two Mexicans to ascend the mountains. In the course of two or three days they returned and reported that the Ventana was the result of two high overhanging cliffs. These two gentlemen of leisure habits evidently took their "bacon and beans" to some shady retreat at the base of the mountains, where under the shade of a mesquite tree they lingered a few days, dreamed the story of the overhanging rocks, and then came to the city to claim their reward.

One of the early days of the holiday vacation, while Mr. Hoxie and myself were wheeling along the foothills, we concluded to make an effort to reach the Ventana. The remainder of the day was occupied in selecting the most suitable cañon from which to make the ascent. A few days later, with the addition of Messrs. Hall and Forbes to our party, we took our breakfast by late moonlight, and long before sunrise were rapidly wheeling along over the hard *caliche* trail toward the mountains. The crisp December air, at this early hour, had considerable snap to it, and vigorous exercise was required on our part in order to keep comfortable. When half way to the mountains the Rilitto River offered us a surprise, in that, although usually a dry stream, it was now three or four rods wide with a thin sheet of ice at either side. There are many more pleasant things to do than to sit down on an icy bank on a cold December morning, strip off one's shoes, and then, with bicycle, lunch, shoes, and camera on one's shoulder, march across even a few rods of water just down from the snow-covered mountains. A half hour from the river, winding in and out among cacti and palo-verde, brought us to the cañon leading to the Ventana, — a superb cañon, guarded where it opens from the mountains into the foothills by a series of high, rugged pinnacles and a number of massive granite columns, while from its centre, rising to the height of nearly two hundred feet, is a great perpendicular rock, which Time with his flinty chisels has not succeeded in cutting away, and which is now guarded by legions of giant cacti. A few minutes before eight, with a few sandwiches in our pockets and the camera dissected and distributed among the members of our party, the ascent was begun. A half mile or more, and we were in a broad open portion of the cañon, where, looking back, the Tucson plains stretched away to the distant Santa Ritas, — a great barren stretch of fifty miles, without trees, without houses and cultivated fields, without life, save for the stunted bushes and spine-covered cacti, the fleet jack-rabbit and the skulking coyote. A vulture circling about on the distant horizon told only too well where an animal had died of starvation, and where its bones would soon be bleached white by the desert winds.

Where the cañon again closed in between granite walls, a great cactus stood as Nature's guardian to the narrow gateway. Its spine-covered arms hung twisted and broken by its side; the fleshy tissue had fallen from all its upper portion, leaving the long white ribs exposed to the elements. For at least a century it had stood at its post of duty; but now the mountain breezes sang doleful music in its half-shattered branches, sapsuckers and owls had pecked great holes in its soft tissue, its surface was roughened and scarred by time, and insects had eaten into its heart. It was all but ready to stretch itself lifeless, but yet stood dressed in its spine-covered armor of life at the place it had kept its vigilant guard for so many years.

A little beyond, the vegetation became more dense, flat-stemmed cacti and century plants climbed well up the mountains at either side; oaks and alders threw patches of shade over the waters that dodged in and out among the many boulders which covered the floor of the cañon; grapevines and climbing milkweeds stretched themselves over the gray rocks, and masses of clematis took possession of thorny bushes and hid the ragged branches beneath the rich, green foliage, which with this plant is much more luxuriant in winter than in midsummer. A squirrel occasionally came into view from behind some near-by rock, and in the soft, moist sand by the mountain stream was observed the trail of a mountain lion.

A tramp of some three hours, following the crooks and turns of the now narrow cañon, brought us to a high precipice, over which the melting snows were spilling a fair-sized stream half hidden at either side by glistening sheets of ice. A fall of a hundred feet sent the water dashing and spattering over the neighboring rocks, still half encased in their icy armor, donned by the light of the full moon of the night before. Climbing a low hill at the right we escaped the precipice, and reached the cañon again at the next bend a half mile beyond.

The ascent of the hill was rendered at least a little uncomfortable by the great patches of *amole* which must be passed in order to reach the top. The many stiff, sharp-pointed leaves, rising a few inches above the ground, stuck out in all directions like so many upturned daggers. Not only would they sometimes pierce our leggings, but occasionally one would find its way through the leather of our shoes and bring us to a realizing sense of where we were treading. Where we descended the hill and again reached the cañon a widespreading opuntia raised its broad flat stems above the neighboring bushes, presenting for our inspection a number of bright scarlet fruits nearly as large as one's fist. The cactus fruit, or Indian fig, is said to be delicious to the untamed palate, and surely the attractive appearance of the fruit on this plant did not belie the statement. Although knowing full well their formidable armor, we could not resist stopping to test them. As the exterior of the fruit was covered here and there with many small patches of almost microscopical, barbed bristles, we harvested them with a stick, rolled them about on the rocks to break off the prickles, and then undertook to eat them.

They were found to be not at all unpalatable, the flavor being something akin to that of a strawberry. The small bristles, however, had a wonderful faculty for getting into one's fingers. Not only our fingers became pincushions for them, but they soon made their presence felt in our tongues. The "feast of wild figs" was abandoned, or rather transformed into a series of reciprocal investigations of each other's tongues in our efforts to locate and withdraw the bristles.

When within a mile of the divide we stopped to eat our lunch and get a few moments' rest. After some discussion, it was thought best to leave the cañon and make an effort to reach the summit of the rough ridge to the right. When the ascent was about two thirds made, two of our party gave up the attempt, and stopped to rest on a broad flat shelf surrounded on three sides by many large pointed rocks rising forty feet or more above our heads. Mr. Forbes and myself pushed on, but were soon brought to a halt before a nearly perpendicular cliff of some fifty feet, which we thought necessary to scale in order to reach the summit. A crevice to one side seemed to offer the best foothold, and, armed with a long flower-stalk of the century plant, we worked our way inch by inch up the crevice until we finally reached the top. At one point, in order to get over a portion of the cliff some ten feet in height, without crevices or projections that might offer a foothold, the strong, stiff flower-stalk was called into service. Placing it upright against the cliff, the lower end resting on a projecting ledge, Mr. Forbes held it in place, while, after a little puffing and blowing on my part, I managed to climb it and establish myself on the ledge above; I now held the serviceable flower-stalk while my companion did the climbing. The remainder of the ascent was not difficult. We soon passed to the north of a high granite cliff, and found ourselves in a forest of yellow pine and knee-deep in snow; a little beyond we reached the summit, or rather a narrow saddle between the two uppermost pinnacles, but where was the Ventana? We had reached the ridge of the second range, but could see nothing which had the appearance of an opening through any of the neighboring cliffs. It was already two o'clock in the afternoon, and if we were to get out of the cañon by nightfall, it was necessary for us immediately to retrace our steps. By a somewhat lengthy détour to the left we succeeded in getting around the steep cliff we scaled on making the ascent. Somewhat chagrined at not finding the Ventana, we joined the two members of the party below, and hurried down the cañon.

It was moonlight when we reached our wheels, and an hour and a half later when we reached Tucson. Fourteen hours of continuous intense exercise, and the Ventana was as much in dispute as ever.

A telescope was brought into use the next day, and a careful search made of the two cliffs. We had climbed the high cliff to the right, and were a thousand feet above our goal, and a quarter to a half mile to the east and north. If we had kept up the cañon a half mile farther, we should have reached it with much less fatigue than in that experienced. We now knew the route fairly well, and decided to make another attempt the last day of the year. The members of the second party were Messrs. Billman, Hall, Hoxie, Herndon, and myself. We followed the main cañon nearly to the divide, or to where a lateral branched to the right that led directly up to the lower cliff. At twelve o'clock we swung round behind the cliff into deep snow, well protected from the sun by one hundred and fifty feet of vertical wall. A little later a patch of sunshine on the low bushes attracted our attention. It was poured through the Ventana! We were soon in the open window.

The granite cliff forming the summit of the ridge is some forty rods long, nowhere more than ten to twenty feet in thickness, and from one hundred to two hundred feet high. The opening is a perfect archway some thirty feet wide and fifteen feet high through solid granite; the floor covered with massive irregular boulders which Nature left there when she keystoned the arch.

Standing in the Ventana, we could descry the buildings in Tucson like mere specks at the base of the Tucson mountains. Southward, the plains spread out in one continuous stretch far into Mexico, while to the north range after range, broken by deep cañons and stupendous cliffs, stretched away to the San

Pedro. Facing the south, we could look down three hundred feet of vertical depth to the rocks below, while to the north the bush-covered ridge sloped away from the very floor of the archway, making it easy of access. There was no possibility of getting a photograph that would show the full width of the archway; however, a narrow ledge at one side enabled us to get an oblique view through the Ventana. Two legs of the tripod were half folded to better fit the irregular rocks. The focusing-cloth accidentally dropping from the camera fell some three hundred feet over the cliff.

A fire was built among the rocks on the floor of the archway, and a stiff breeze from the south drove the smoke through the opening, where the sun shining on its particles came out clear and bright in the deep shade.

Two students hearing our conversation of the accessible route as mapped out by our first experience reached the archway two days before our final attempt, and really claim the honor of being the first to stand in the open window. Howbeit the question is settled; our old-timers are now wondering if this is the real Ventana of years gone by.

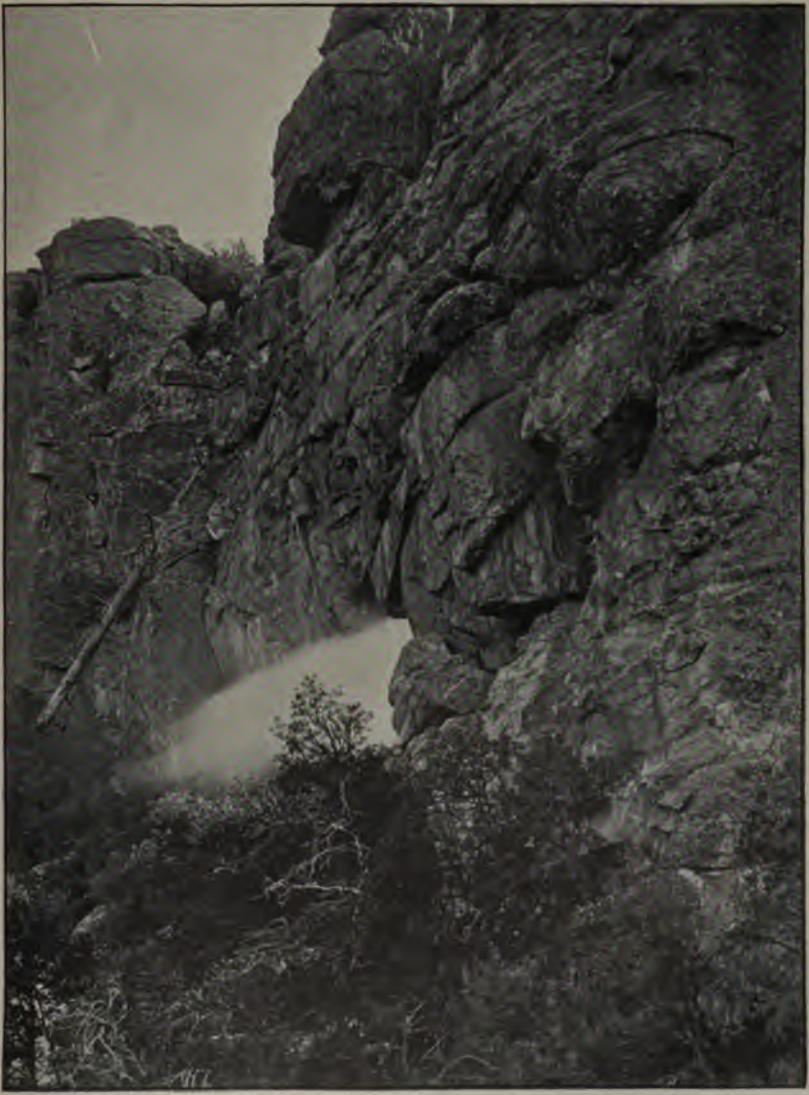
An Ascent of Mt. Mitchell.

By Charles Sloan Reid.

Read June 9, 1897.

Mt. Mitchell, that lofty peak of the Black Mountain system, which, with one part of its broad base in Yancey and the other in Buncombe County, North Carolina, reaches to the altitude of 6760 feet, is the highest point of land in the United States east of the Mississippi River. From where the ascent is begun to the top of the peak winds a tortuous path twelve miles in length.

It is the close of June, and spring is not yet old in the valley at its foot, which morning and evening resounds with the chatter of many birds. It is early morning when we start, and the



SUNLIGHT THROUGH "THE WINDOW," SANTA CATALINA MTS.

rising sun's spreading rays are just chasing the shadows back along the opposite hills.

At first we wind along the edge of a twisting, turning, leaping mountain stream, which, although small in volume, has worn its way through the rocks, here and there foaming along between deep-cut walls of the ragged granite. Along the stream large white rhododendron, or mountain laurel, is in luxuriant bloom, the beautiful wave-like blossoms standing out distinctly among their bright green surroundings. Farther on we become interested in the peculiar tree growths on either side of the trail, gnarled and twisted trunks forming quaint and curious figures, picturing to the fancy the weird characters of some forgotten lore, thus transformed by displeased genii.

Now and then, as we climb on, we cross the little mountain rivulets until we reach a point about five miles from where we began the ascent. At this place there is a sudden opening; a cleared space here once responded to the tiller's toil, and here once stood a little lone cabin, the home of a famous old guide and hunter of the mountain. The spot is known as the "Half-way House Place." We stop at the spring and take long draughts of the icy water, for we shall not come to another for a long distance.

From this place the trail grows much more tortuous, being a rugged, winding, water-worn path, arched over by the clinging arms of balsam, forming a dense labyrinth, which is only relieved at intervals, as we make our way along the edge of some sharp cliff, where the sudden opening affords a view of rare sublimity; or, as we come suddenly into a natural garden, where, on either side of the trail, large, deep purple double blossoms of the rhododendron form clouds of infinite beauty against the milky white mist of the mountain, as it rises ever and anon, obscuring for a brief time all below us.

All along, beneath the laurel branches, is a dense growth of lichens, embracing many peculiar varieties whose characteristics are interesting to note. The little mountain boomer, or brown squirrel, the pheasant and wild turkey, move away carelessly before us; and here and there we see where the bark has been torn away from the trunks of the balsam-trees by the teeth of bears.

Now, arrived almost at the top, we become sensible of a great change in the atmosphere, and find ourselves in a latitude where it is early spring. The breeze that blows steadily over the thickets of dwarfed balsam is severely chilly, as it comes against our cheeks.

On reaching the summit, we find ourselves on a rocky point in the midst of an unending sea of pure white mist, seemingly dense enough to grasp in the hand. Not a single point of the world below us is to be seen. There above us is the sky, and beneath us and around us the infinite, misty ocean. We feel like another people dwelling alone in another world. One thing only holds our senses appreciative of the conditions of the one we have left behind us, and that is the presence of the dead. On the highest point of this high peak lies all that was mortal of the man from whom the mountain takes its name, — Rev. Elisha Mitchell. At the head of the grave stands a tall metal monument fourteen feet high, erected to his memory by the men of Buncombe and Yancey counties. Every visitor who has had the perseverance to reach the spot contributes a stone to the heaping mound above the grave as a mark of respect for the memory of the devoted scientist.

And here will be appropriate a few words about the tragic death of Dr. Mitchell, the melancholy incident which gave to the peak, formerly known as Black Dome, its present name. During his long term of service as Professor of Mathematics in the University of North Carolina, Dr. Mitchell had made a study of the topographical features of the mountains of the western portion of the State. A few years before his death he had proven to his own satisfaction that the twelve or fifteen lofty peaks of the Black Mountains were a distinct system lying diagonally across the Appalachian chain; and of these peaks he had, by the indications of the barometer, shown Black Dome to be the highest; and it was to establish this beyond a doubt, by accurate instrumental measurement, that he went, accompanied by his son, in June, 1856, to explore for the third or fourth time this gigantic peak. After having done a good day's work, Professor Mitchell started alone down an old pass to reach the home of a man by the name of Wilson, who lived in Yancey County at the foot of the mountain. This was the last time he was ever seen alive. After a two days' careful search, in which the late Governor Vance of North Carolina took an anxious and active part, the body of Dr. Mitchell was found at the bottom of a deep pool in the Cat-tail Fork, a rushing mountain stream which he had endeavored to cross. The remains were carried to Asheville and there interred, but were afterwards removed to a rock vault on the loftiest point of the peak, where he now sleeps all alone.

Here on the summit we linger, though shivering with cold, a long, long while, giving ourselves up to the nameless feeling that fills our bosoms with a strange, new joy born of appreciation for the sublimity of our position. Above us glows the midday sun in the zenith of his splendor, and below us and around us is the mist. Nothing else is visible save the little point on which we are standing. Far away in the distance the limitless sky and the infinite sea of mist seem blending in a pacific union.

At length our limbs begin to grow stiff with the penetrating chill, and we again turn our footsteps toward the world below us. At one other point on our descent do we stop, at Clingman's Dome standing 6577 feet above the level of the sea. Here we are below the clouds, and, as we turn our eyes toward any point of the compass, an indescribably grand panorama opens to our view. There, far away below us, are the ragged peaks of mountains that fall off gradually in altitude, as the vision wanders away toward the valleys and plains where the streams wind along through the lands of springing green.

At last, though reluctantly, we tear ourselves away from this grand lookout, and return to the path, along which we continue our way, rolling, tumbling, leaping, running, involuntarily, down the steep and rugged trail, arriving at the foot of the mountain[1] with many bruises, but with hearts full of satisfaction, which proves a rapid healer.

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[1] The ascent of Mount Mitchell may be made on mules, well trained to the service, but this mode renders it necessary for parties to spend the night on the mountain, as it requires a day to make the ascent and another to make the descent.

Nyo-ho-san.

BY LUCY A. PUTNAM.

Read May 8, 1895.

IT was a perfect June day, — a day to make the most of in a rainy country like Japan. According to Murray's guide-book the ascent of Nyo-ho-san is "the best of the mountain climbs in the neighborhood of Nikko." We had seen its picturesque summit and notched ridge looking over the lower mountains on our way to Lake Chiu-sen-ji the day before, and had asked our guide if he had ever been there. Of course he had. Was there ever a place yet that the guide from the nearest hotel had not visited? Gentlemen often went, he said, but for ladies it was quite another matter. "Too bad, no can go."

A careful perusal of Murray convinced us that there were no great difficulties in the way, and after breakfast we told the hotel guides that we were going to Nyo-ho-san, and would like one of them to go with us. Great was their consternation. "Ladies could not go!" But unfortunately the lady would. Then the guides would not. It was too hard; they would get too tired. Later in the day the members of our party who stayed behind succeeded in extracting the confession that they had never been there, but our guide of the day before had not dreamed that we would really undertake the trip, and thought himself quite safe in saying that he knew all about it.

A messenger was dispatched to the village to find a man who knew the way, and in ten minutes a bright little coolie appeared, clad in the usual blue blouse and the skin-tight trousers that are made to fit so closely by having a piece set in at the back, very much the way in which the cover of a base-ball is made. Our tiffin basket was strapped on his back, straw sandals were put on over our shoes, and at twenty minutes past nine we were off, followed by incredulous looks, and, I am afraid, by not a few derisive remarks from the entire household, — for none of them expected us to get to the top. Why they should have been so incredulous we could never discover, for the Japs are a mountain-loving race, and Nyo-ho-san is by no means as difficult of ascent as many of the mountains to which they make pilgrimages. The children were toddling about on their little clogs and playing in the clear stream that runs through the gutter. "Ohayo! Ohayo!" they all called after us as we passed. Soon we left the street and followed a gradually rising path through the fields. The azaleas were in full blossom, — white, scarlet, and flame-colored. The purple blossoms of the wistaria hung from every tree. The deutzia bushes were sheets of white. Ferns and flowering grasses grew along the path, and Jack-in-the-pulpit preached his little sermon under his brown canopy. Everything was rejoicing in the warm June sunshine. A mountain brook ran noisily over its pebbles, and the trees rustled in the breeze. All around us was something of the fragrance and the melody that make the New England woods and pastures, to those who know them, the loveliest in the world.

Three quarters of an hour after leaving the hotel, we reached the first landmark on our road, as described by Murray, — a great stone with an inscription informing the Japanese public that there must be no shooting on these premises. Beyond the stone was a moor stretching up the mountain side to the second point on our way, the rim of an ancient crater. Here our troubles began. On and on we went, through the slippery bamboo grass, sometimes up a steep pitch, but usually over that most fatiguing of all grades, — a gradual slope that is neither a walk nor a climb.

At last we came to a little Buddha, and threw ourselves down on the grass beside him, feeling that we had found a friend. There is nothing in Japan that we shall remember longer than the wayside Buddhas. They have an almost human interest. At every turn you find them: sometimes one alone; more often a row of them, sitting on their lotus thrones and gazing out into the world with smiles of calm benignance, or regarding you with disapproving eyes, or smug expressions of satisfaction that they are not as you. It was very pleasant sitting there. A skylark was singing overhead, and up the hill came the boom of the great bell from the convent near the tomb of the shogun Isyasu.

Beyond the Buddha was a long stretch of moorland, ending at last in a steep hill with a fringe of trees on the top. This we were sure was the edge of the crater, and we struggled up only to meet with disappointment. Miles of moorland lay before us, and beyond was a long ridge up which our path wandered until it was lost in some scrub at the top. I think if we had known then just how much there was of that moor, we should have turned back. Fortunately we did not know. The sun was hot, though the air was cool, and we were up so high that the trees were not yet in leaf. I do not know whether the fault lay in the Nikko air, or in ourselves, but never before or since have we experienced such breathlessness in mountain climbing.

At last, when it seemed as if we could go no farther, we reached the first top. Five minutes' descent through the alder scrub, where the brown tassels were just beginning to open, brought us to the edge of the crater, two hours and a quarter from the time we reached the moor. Murray allows an hour, — a fact that disturbed us greatly, but we soon found that it was a mistake. The whole time that he gives, four hours and a half, is ample for the ascent of the mountain, but it is incorrectly divided. The view from where we were standing was wild and desolate. Thousands of feet below us was the Inarikawa, and across the chasm were the red precipitous cliffs of Akappori. Nyo-ho-san was hidden by two lower wooded summits that we had to cross.

Beyond the crater we found that the snow still lay thick in places under the evergreens, and our shoes were soon soaked. An hour of rough climbing brought us to a ravine so full of snow that for a moment we thought we should have to turn back. It is one thing to go through snow up to your ankles, but quite another if you should sink in up to your neck. We got across, however, on a fallen tree, and in five minutes more were at the foot of the peak. There we ate our luncheon, the thinnest of sandwiches from the daintiest of wooden boxes. The putting up of lunches is one of the fine arts of Japan. We put our water-bottles in the snow to cool, and shivered in the sun. We had gone from June to early March.

It was half an hour's pull to the summit, 8130 feet above the sea. At the top is a tiny temple with the arms of the Tomoya family on the door. The view from the platform in front, or, better still, from the great rock behind, is entrancing. We were surrounded by countless peaks, most of which were unknown to us. To the east was a great plain where a double row of tall cryptomerias marked the old road from Utsonomiya. Beyond, in the distance was Tokyo and the blue waters of Yeddo Bay. Northeast was Nasu-no-yama, with a cloud of smoke above its summit. Away to the north was the snow-clad Bandai-san, and nearer and more to the west was another line of fine snowy tops. Due west and right at our feet was a lower peak of our own mountain. Beyond were Ko-manago, O-manago, and the round dome of Nantai-san by Lake Chiu-sen-ji. Still farther away was the bare cone of Shirane-san. On the southwest was Asama-yama and the hills about Ikao, and to the south the place where Fuji should have been visible, but we saw only a cloud. A little to the east, and six thousand feet below us, lay the town of Nikko, its flat shingled roofs shining in the sun. From there we could trace our path up the moorland and over the two summits that we had just passed, and we laughed at the memory of our discomforts of the morning.

We were only three quarters of an hour going back to the crater, and we fairly raced over the moors. At the little Buddha we stopped again to rest. Our coolie looked at us admiringly. "Ichiban," he said, patting his knees to emphasize his meaning, — "Ichiban." It was the sincerest compliment I ever received. Three quarters of an hour later we were back at the hotel, but I do not think the guides ever quite believed that we had really been to the summit of Nyo-ho-san.

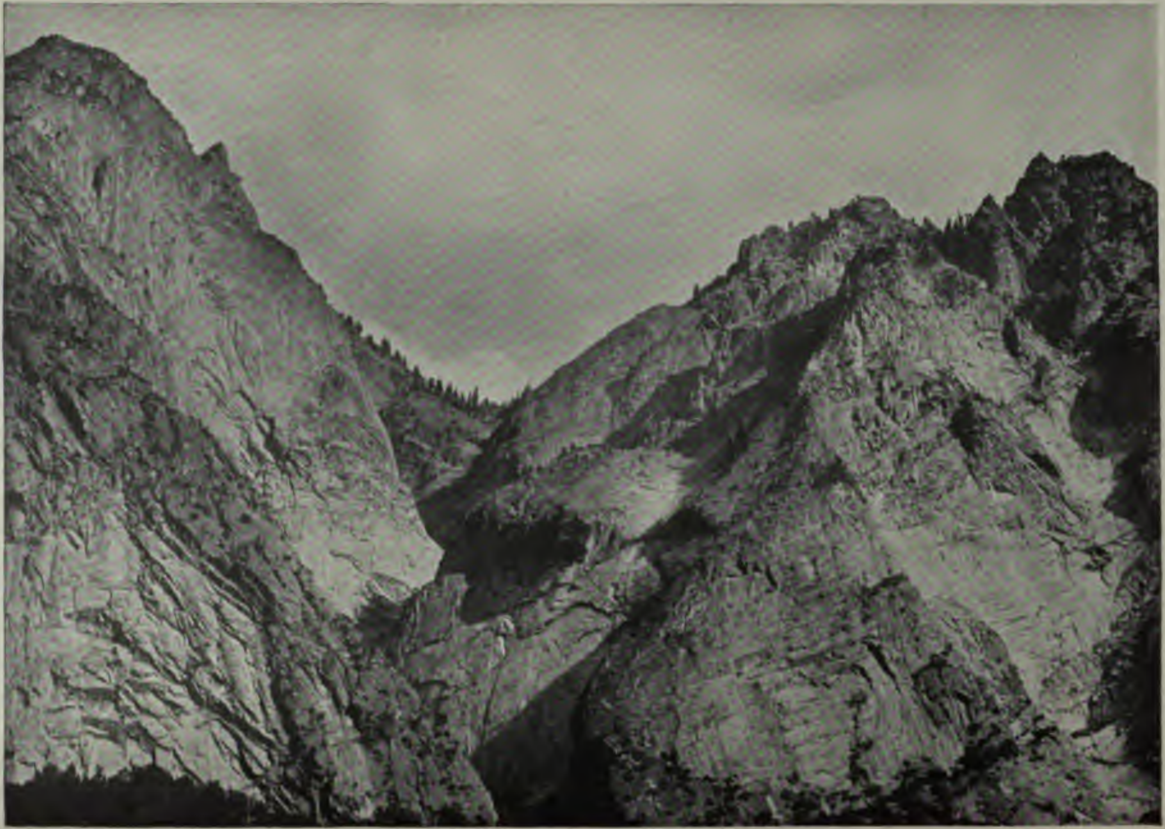
Explorations in the Sierra Nevada during the Season of 1896.

By Theodore S. Solomons.

A number of well equipped parties entered the High Sierra during last summer with partial purpose to extend our knowledge of this little known region by observations and explorations along certain lines suggested by the Sierra Club to its members. The new map issued by the Club just prior to the opening of the season did much toward inspiring and encouraging this work.

As has been the case during several years, the area drained by the South Fork of the King's River received the lion's share of attention. This part of the range, besides its greater elevation, possesses some marvellously fine cañons, and on the whole seems destined to enjoy as wide celebrity as the Yosemite region, one hundred miles farther north.

Mr. J. N. LeConte, Instructor in Electrical Engineering in the University of California, made a thorough exploration of the principal branches of Bubb's Creek and the Main South Fork of the King's River. These two streams unite to form, or at least to drain, the now famous King's River Cañon. With a party consisting of Miss Estelle Miller, Miss Helen Gompertz, and Mr. and Mrs. Gould, he journeyed among the high northern tributaries of Bubb's Creek, scaled Mt. Gardner (13,324 feet), never before climbed (the ladies nearly reaching the summit); crossed southward to the sources of the creek in that direction; ascended with the ladies University Peak (13,515 feet), which he himself had named some years before; and finally led his party safely to the summit of Mt. Brewer (13,886 feet). In 1895, Mr. LeConte, accompanied by Mr. Harvey Corbett and Professor Clarence Cory of the University of California, had ascended this peak for the first time since its naming in 1864, but had failed to find record of the original ascent. On the present occasion, however, one of the ladies descried the corroded tin vessel, which had fallen from the frail cairn in which it had been deposited, and was nearly covered by rock and snow. The pencilled inscription within, dated



GORGE OF DESPAIR, TEHIPITEE VALLEY, CALIFORNIA.

From a photograph by Walter A. Starr.

July 4, 1864, in the handwriting of Professor W. H. Brewer, was still legible, but the paper showed signs of imminent decay. For this reason, although the document was photographed by Mr. LeConte and returned to the cairn, it was subsequently conveyed from the summit by another gentleman, and deposited with the Sierra Club, in the rooms of which it now hangs framed, a valuable relic. A set of some one hundred 5×7 views, which technically are almost perfect, and much valuable topographic data were obtained during the sojourn.

Mr. Bolton Coit-Brown, Professor of Drawing at Stanford University, accompanied by his wife, covered most of the ground traversed by the LeConte party, and much in addition. While resting near the summit of Mt. Gardner, Professor Brown caught sight of the LeConte party making boldly toward him. The somewhat difficult knife-edge summit was attained by both gentlemen in company. Professor Brown next assaulted some peaks south of the Kearsarge Pass, with Dr. T. Wood of Stanford, and then moving camp into the head of the south fork of Bubb's Creek, at East Lake (9,000 feet) in company with his wife, made a two days' trip over the Kern-King's divide, by a foot route then luckily discovered, to the summit of Mt. Williamson on the main crest (14,447 feet). After this, several new peaks were named and climbed, among them Crag Ericsson and Mt. Stanford; and finally, returning to the main South Fork and leaving his wife encamped in Paradise Cañon on that stream, Professor Brown successfully renewed his assault of a year before on the horn-like pinnacle of Mt. King (13,316 feet), never before reached by any human being. A ten mile scramble, among talus and chaparral and across a number of deep and rocky gorges, brought the indomitable mountaineer to the pedestal of his goal, and a wearisome climb with hands and feet enabled him to attain a position some hundred yards below the summit. Here, uncoiling from his body a stout rope, he completed the ascent by lassooing crags above, or by throwing the knotted end into crevices, wedging it securely, and then drawing himself upward.

Mr. Howard Longley of Los Angeles and party spent some weeks in photographing and exploring the watershed of Bubb's Creek. Their intention was to improve a certain route over the Kern-King's divide connecting the cañon region of the former river with Mts. Whitney, Tyndall, Williamson, and other peaks at the head of the latter, — a route which had been found and pursued two years before by a party of which Mr. Longley was a member. This pass, which had been resorted to occasionally by shepherds, who named it Harrison's Pass, seems to offer the only, or at least, the best solution of a vexatious problem, — that, namely, of avoiding the wide détour to the desert for those visitors of the King's River country who desire to scale the highest peaks in the United States. Want of time preventing, Mr. Longley was unable to carry out this laudable work; and for some time to come the use of this important pass must be confined to pedestrians. Several parties last summer were unable to take their animals over it.

Professors Stillman and Richardson of Stanford University, after a delightful sojourn in the King's River Cañon, made a rather rough but successful trip over the high divide to Tehipitee, the valley or cañon of the Middle Fork of the river. Careful notes and observations enabled these gentlemen to lay before their fellow club-members a description of their route which it is hoped will encourage increased travel to Tehipitee during next summer.

Mr. T. P. Lukens of Pasadena, accompanied by Mr. Walter Richardson, made a one hundred days' trip in the Sierra, beginning July 9. Their route through the Kaweahs to the Kern and its high peaks, through Bubb's Creek, and later along the desert to the Yosemite country, led them to pursue well-beaten paths; but some quite new and very valuable work was done at certain points of their splendidly long journey. Mr. Lukens generously employed some miners to render passable a very rough trail down the Middle Fork Cañon to Tehipitee, thus providing an easy eastern approach to that little known Yosemite; some weeks later he visited, and has since described, some interesting hieroglyphics on rocks in an eastern slope gorge, a very beautiful sheet of water, — Convict Lake, — and a number of mineral springs and extinct geysers situated in what appears to be a miniature Yellowstone Cañon never before brought to public notice. This may be located on our map as in the basin of the south branch of Hot Creek.

The writer, acting as guide to a party of friends composed of Misses Estelle, Bertha, and Mabel Sweet, Mabel I. Davis, and Mr. Adolph Sweet, made an early summer trip to the Upper Tuolumne Cañon, completing his collection of views and sketches there; and while the snow still lay thick upon the mountain slopes made an ascent of the glaciers and summit of Mt. Lyell (13,042 feet).

As must appear from this brief report, the only obstacles to the enjoyment of every privilege of the mountaineer which our adventurous young women encounter in the Sierra are those which arise solely from the relatively inferior climbing ability of the sex. When an abundance of time minimizes this, the difference is practically cancelled; and, in a climate that for five months is one of uninterrupted spring, with an immunity from every danger more serious than the attack of the ubiquitous mosquito and constantly surrounded by those minor objects of loveliness that serve to brighten the intervening days of rest spent in camp, our college girls and home-wearied matrons may participate in all those larger and sterner ventures of mountain conquest which in less favored climes have been mainly undertaken by the other sex.

On July 3, I left Yosemite with Mr. Walter A. Starr and Mr. Allan L. Chickering. We explored and photographed the upper basin of the Merced, and went carefully over the ground I had twice before travelled in the extensive drainage basins of the San Joaquin and the Middle Fork of the King's. We covered some two hundred miles of very rough country, in the heart of the wildest and least known parts of the Californian Alps. Comparatively little territory new to the writer was explored, the object of the expedition being mainly to photograph and map this connective strip of crest between Yosemite and the King's River Cañon. The fruits of the trip include topographic data, — altitudes and contour sketches; geological data and specimens; and about one hundred and twenty $6\frac{1}{2} \times 8\frac{1}{2}$ negatives, among them being a number of cloud views taken, at the request of the officials of the Weather Bureau, at very high altitudes with all the modern appliances.

Charles Eliot.

By George C. Mann.

The death of Charles Eliot, in the prime of his manhood and at the height of his usefulness, was a severe shock to his friends, and a calamity to the cause of park creation and adornment. His friends mourn the loss of a gentle, modest, and courteous associate; the community is deprived of a high-minded, public-spirited citizen, a man bringing to his professional work rare gifts of generous enthusiasm and artistic insight, combined with an unusual power of clear and convincing statement, and of persuasive eloquence. The Appalachian Mountain Club loses in him an honored member, to whose official faithfulness it owes one of its own chief titles to public regard.

It is appropriate, in a notice of this sad event in the pages of Appalachia, that not only should an account be given of the great work that he did for Greater Boston, but that special record should be made of the origin of the movement for the creation of the Trustees of Public Reservations and of the Metropolitan Park Commission; for, in the words of the resolutions to his memory, adopted at a recent meeting of the Club, it was "through his clear prevision and stimulating energy" that the Appalachian Mountain Club "was led to take the initiative that has resulted in the permanent dedication to the public of beautiful and historic places, and the establishment of a noble system of public parks in the vicinity of Boston."

It was in April, 1890, in the first year of Mr. Eliot's service as the councillor of Topography of the Club, that at his suggestion a committee of the Council was appointed, to call a meeting of persons interested in the preservation of scenery and historical sites in Massachusetts. He saw that there was good will enough towards the preserving and devoting to the use of the public of interesting and attractive sites and scenes in the neighborhood of Boston and other cities, or along the seashore, and that public-spirited property owners and tax-payers were ready to coöperate in such dedication, but that there was need of some simple machinery to make the ideal practical. He suggested a board of trustees, a body corporate, similar to the Trustees of the Museum of Fine Arts, who should be empowered to hold for the benefit of the public the places which he desired to see preserved and opened, and which, through municipal jealousies and the accidents of ownership, were likely to be lost. In his own words: —

"Opportunities for beholding the beauty of Nature are of great importance to the health and happiness of crowded populations. As respects large masses of the population of Massachusetts, these opportunities are rapidly vanishing. Many remarkable natural scenes near Boston have been despoiled of their beauty during the last few years. Similar spots near other cities of the commonwealth have likewise suffered. Throughout the state, scenes which future generations of townspeople would certainly prize for their refreshing power are to-day in danger of destruction. Unless some steps towards their effectual protection can be taken quickly, the beauty of these spots will have disappeared, the opportunity for generous action will have passed."

He interested a few men of standing and influence in his plan, and taking advantage of the organization and kindred aims of the Appalachian Mountain Club as means towards the desired end, he issued a circular of invitation to persons interested in the preservation of scenery and of historical sites in Massachusetts, to a public meeting. The circulars were sent in large numbers to all parts of the Commonwealth, and the answers received were most cordial and encouraging. There was in nearly all of them an expression or an undertone of enthusiasm that bore testimony to a widespread sympathy with the movement. The day of this meeting, the 24th of May, 1890, ought to be a red-letter day in the annals of this Club. An organization was that day effected, and a plan of incorporation prepared for presentation to the Legislature. To make the story short, the act of incorporation was passed, with little or no opposition in the following winter, and this first step was an accomplished fact.[1]

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[1] A more detailed account of this meeting may be found in the report of the Councillor of Topography for 1890. — APPALACHIA, Vol. VI., pp. 258–261.

The first report of the Trustees of Public Reservations bears testimony to the enthusiasm and well-directed effort of the prime mover in the organization. After rehearsing the steps through which the Trustees came into being, it takes up specific cases in which the aid of the corporation had been invoked, and appeals to a generous public for the means of increasing its usefulness. It goes on to the broader consideration of the extent and condition of public spaces throughout the state, and already reports a conference of park commissioners and committees of the metropolitan district surrounding Boston, at which the desire for immediate, effective, and comprehensive action towards the reservation of ample public open spaces was so general that a committee was appointed to draft a memorial to the Legislature, asking for prompt action in this direction.

The second report, for 1892, is able to announce the constitution of the original temporary Metropolitan Park Commission, whose recommendations, presented to the General Court[1] in 1893, resulted in the establishment of a permanent Commission, and the immediate and unexpected, but most gratifying acquisition of the Blue Hills and Middlesex Fells and other park reservations.

These facts have been given in some detail because they are the outgrowth of the original thought in the mind of Charles Eliot that led him to propose the meeting of May 24, 1890, held, as we have said, under the auspices of this Club. It is within bounds to say, that to him more than to any other one man is due the credit for the priceless boon acquired by the people of Greater Boston in their magnificent systems of Metropolitan parks. And this Club may fairly claim that its organization, its aims, the public opinion that it had created, and the ready support and sympathy that it gave to the practical work of agitation for the reservation and preservation of the beautiful natural scenery in the neighborhood of our city were important factors in the speedy and effectual realization of this great result.

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[1] On the morning of the day on which the Joint Committee of the Legislature voted unanimously to report favorably on the bill creating the permanent Commission, a special hearing was given by that Committee to representatives of the Appalachian Mountain Club, at which several leading members earnestly urged the proposed measure.

That immediate success was far from Mr. Eliot's mind is evident from a remark in one of his reports as secretary of the Trustees of Public Reservations. "Some day, perhaps," he says, "the State may create a commission and assume the charge of a large number of scattered spots, to be held for the enjoyment of the people. But this day is not yet." These words were written in 1892. Before the end of 1893, the Metropolitan district was in possession of several thousand acres of such land!

In a certain sense, and to a certain degree, this greater scheme had superseded and swallowed up the special work of the Trustees of Public Reservations. But the genuineness of the public spirit of Charles Eliot is manifested in another remark from one of his reports for this Board. Alluding to the fact of its diminished usefulness he says: "It is evident that the growth of park boards and improvement associations will relieve this corporation of much work that it might otherwise perform. This, however, is not a matter of discouragement, but of encouragement. If the principle abides and grows stronger, that what is beautiful in Nature and of real historic interest must be preserved, we are content."

It is a gratifying thought to those who have felt the charm of his personality that he seemed to disarm opposition, and that obstacles melted before him. His friends who heard him address audiences of the most diverse character, a legislative committee, a company of business men, or a group of Provincetown fishermen, testify to the convincing persuasiveness of his words. When he had spoken, the subject was understood, and his conclusion accepted.

The thirty-seven short years of his life were singularly rich in the accomplishment of results that will be permanent. It seemed almost as if he had exhausted, with a few years' labor, the possibilities of an ideal public park system for the neighborhood of Boston, and that he would soon have been left without an occupation. But he had been consulted, only a short time before his death, with regard to the future parks of Greater New York, and had entered with characteristic zeal into the study of that large question. And indeed, there still remained much detail work to be done here at home. One of the last and most gratifying successes of his professional life was his victory, in the face of defeat, in preserving free from any obstructing building the grand sweep of the beach at Revere, and assuring for that shore a thoroughly artistic immortality. No wonder that those whose adviser and inspirer he had been stood at a loss without him, as if with a block in their wheels.

A proposal has been made that a memorial of the public recognition of his invaluable services should be erected at some spot in the Metropolitan park system. Let the suggestion be seconded and furthered until it shall become a reality. Whether on the shore of the sea, or in the seclusion of the woods, or on the hilltops with their far-extending views, men should be glad to offer their homage of gratitude to the memory of a high-souled and rare lover of Nature, whose life-work it was to preserve its beauty and simplicity for the higher æsthetic and spiritual refreshment of mankind.

Bibliography.

LAKES OF NORTH AMERICA. By ISRAEL C. RUSSELL. Boston: Ginn & Co.
GLACIERS OF NORTH AMERICA. By ISRAEL C. RUSSELL. Boston: Ginn & Co.

These two volumes treat of important factors in our topography and geography. Professor Russell, with his opportunities for study, is especially well fitted to consider and discuss the subjects, and his results are in every way worthy of high praise. The interest which we have in the lakes is in their close relations to the topographic development of the land, for the steps of progress in land formation and in erosion create them and destroy them. Lakes, it appears, have their life histories, which exhibit the phases of youth, maturity, old age, and decay, which any one may recognize when once his attention has been drawn to the fact. Their possible origin in a dozen different ways is made clear by Professor Russell, who brings into prominence the movements of the waters in lakes, the topography of lake shores, glacial action, and all the other aids and assistants in the formation of these bodies of water.

The immediate success of the book on lakes induced the preparation of the "Glaciers of North America," by the same hand. Its prime purpose is declared to be to furnish reading lessons to students, but the information is of such character, and the manner of presentation is so delightful, that its usefulness will by no means be confined to the schools. Its preëminent feature is the exposition of the fact that North America and not Europe is the place in which to study glaciers, for Europe presents but a single type of ice-river, while we can show three. Of great value is the consideration of the causes for the motion of glaciers. Not less than half a dozen hypotheses have been set forth, and out of the whole an eclectic theory is here evolved embodying the principles of the others, and more satisfactory on the whole than any one of the old ones. The treatment of the subject of glaciers is broad and comprehensive, and criticism can be made only of minor details, as, for example, that the terminology seems a little inflexible, and that in the enumeration of Canadian glaciers the most important one in the country south of Alaska is entirely unnoted.

J. R.

NORTH CAROLINA AND ITS RESOURCES. Published at Raleigh by the State.

This volume is a portion of a project on the part of the State of North Carolina to make better known to the world its picturesque and commercial advantages, and the information conveyed by it is therefore authentic. A short historical sketch is the initial feature, followed by the outlines of the topography, which of course is most interesting to the manufacturer, and then come remarks on the climate and the forests. The latter constitute the wealth of the state, and the showing is very attractive. The flora is a remarkable one, including about six thousand species, a large proportion of which are of economic value, while the mineralogy has been attractive not alone for the gems and cabinet specimens found there, but from the fact there exist valuble commercial deposits awaiting the coming of the workmen. It has not been forgotten in the preparation of the volume that the summer resorts are noted far beyond the confines of our country, and much care has been exercised in the presentation of this view of the picture. The volume contains much that is of interest to the casual reader, and is at the same time sufficiently valuable in its statistics to be worthy of preservation in the library.

J. R.

CAMPING IN THE CANADIAN ROCKIES: An Account of Camp Life in the Wilder Parts of the Canadian Rocky Mountains, with a Description of the Region about Banff, Lake Louise, and Glacier, and a Sketch of the Early Explorations. By WALTER DWIGHT WILCOX. With 25 full-page photogravures and many text illustrations from photographs by the author. G. P. Putnam & Sons: New York and London. 1896. Large 8vo, 283 pages. Price $4.50.

This elegant volume, in which Mr. Wilcox pays his loyal tribute to the wild grandeur of the Canadian Alps, may justly claim a prestige over all other books on mountaineering issued from the American press. In all matters of detail — paper, letterpress, illustration, and artistic binding — it satisfies the most exacting taste; while all lovers of the mountain, and in particular such as have enjoyed a visit to the region described so well and so sympathetically by the author, will find a mountaineer's delight in perusing the narrative of his four summers' jaunts, largely aside from usual paths in this newly discovered country.

The superb illustrations bear testimony to the author's rare ability as a photographer of Nature, the full-page photogravures especially being most impressive reproductions of these snowy monarchs of the Northwest. It may not be invidious to single out for special mention Summit Lake with Mt. Assiniboine, that true "American Matterhorn;" Mt. Temple, most stupendous by its mass of all the Canadian Rockies; the Waputehk Range, with its snow-draped parallels; Sir Donald from Eagle Peak; and the beautiful, soft pictures of Upper Bow Lake.

Judged by his book, Mr. Wilcox is primarily an explorer, a student of geology, and lover of wild life, and his camps are largely along the valleys, by the lakeside, or at the base of the great peaks. Single chapters, however, reveal him as an ambitious climber, and, indeed, he holds the record, with our fellow member Allen and their friend Frizzell, for the loftiest ascent among these Alps, that of Mt. Temple (11,658 feet).

We are glad that the book deals so largely with the Rockies. We could have even pardoned the omission of the single chapter on the Selkirks, in order thereby to serve a desirable end, namely: the clearer differentiation in the popular mind of these two utterly diverse ranges. Green's book, together with Huber and Sulzer's and Topham's work in the more western group, has given to the Selkirks a prestige quite undeserved, grand as they are. It is safe to affirm that the Canadian Rockies, with their highest summits ranging a full thousand feet higher than the highest Selkirks, rendered the more inaccessible by their geological structure, and not devoid of glaciers, *pace* the geographers, present to-day the more inviting field to bold climbers. A study of Mr. Wilcox's two views of Mt. Assiniboine will lend a confirmation to this dictum. Add the fact that human feet have never yet stood upon any one of a dozen to twenty giants that form the barrier of the Continental Divide within perhaps as many miles of the Canadian Pacific Railway; for Mt. Temple, though very near, is not on the Divide itself.

The historical chapters are of especial interest, particularly as showing how recent is all our detailed knowledge of this region.

A careful inspection of the work reveals a few errors in figures and in nomenclature, which a second edition will no doubt rectify. It is reported that future editions will be accompanied with a map, a great desideratum. Questions of disputed names is said to be one reason why none appeared with the first edition. It is to be hoped that by consultation with those interested, — the Topographical Survey of Canada, the Geological Survey, the Canadian Pacific Railway, and the explorers of our own Club, who perhaps as much as any agency are at present giving wide currency to names, — some consensus may be arrived at to remove present and avoid future complications.

C. E. F.

ZEITSCHRIFT DES DEUTSCHEN UND ÖSTERREICHISCHEN ALPENVEREINS. Band xxvii. 1896.

Let no one peruse the last two issues of this organ of the great German and Austrian Alpine Club who is unwilling for a time to regard all other periodicals of similar intent as faint, mean, and ineffectual. Since its change of form in 1895 from an ordinary octavo to its present imperial page, it seems to have placed itself, at least as regards the impressiveness of its pictorial work, in an entirely different category from ordinary alpine magazines. Its superb heliotypes and half-tones, some of them 5¼″ by 8″ — indeed one magnificent half-tone, from Sella's panorama of the Mont Blanc group seen from the Aiguille du Midi, measures 25″ by 7″ — reproduce by their very magnitude something of the emotion inspired by the grandeur of the originals. Add to this that the talent of an artist who has caught the spirit of high altitudes is engaged to add the needed subjective human element to the photographic originals before they are reproduced in the most celebrated workshops of Europe, and it goes without saying that its illustrations are unmatchable. To parallel them in America, if at all possible, would be at a cost that few organizations could meet. The volume before us contains 17 full-page illustrations, 39 of lesser size printed in the text, and, as a *beilage*, a map of the Ötzthal and Stubai on a scale of 1 : 50000, measuring some 20″ × 24″, of a style and beauty to make a conscientious American cartographer simply go mad. It is a combination of contour lines with a relief-effect in a sort of light brown stipple for the lofty ridges, the lower parts being of a delicate dove-color and the glaciers in white.

The contents of this volume are varied and of unusual interest. The initial article by E. Richter is on Norway, and deals with it in comparison with the Alps. It treats of field and fiord, of Jotunheim, North Cape, and the Lofodens, the last mentioned of which surpasses all the rest, "lying far out in the broad ocean, with its placid sounds and wild pinnacles, with its alpine ranges fading in the dim distance, and in particular with its entrancing nights, when the rosy hues of sunset blend with those of dawn and seem to make perpetual holiday." In the prefatory words comparing the distinctive glories of Italy, the Alps, and Norway, and setting forth the diminishing human factor in the landscapes, we were interested to meet the statement of a fact which has forced itself upon our attention in the Canadian Alps. In such a diminishing series the scenery of the Canadian Alps would make a yet more extreme term. "Here the most untamed, simple, grand Nature dominates. If Italy is not to be visited with profit and enjoyment except by one who has a feeling for art and a knowledge of history, just so for Norway a previously cultivated eye and a love for pure nature, coupled with a comprehensive power to grasp her meaning, is equally indispensable. Let not him come near who may not be touched by form and color of mountain and vale and by the lines that simple natural forces have produced, and who has no intuitive perception of their 'style' and artistic value. But one thus capable may bear away a grand impression, perchance a stronger one than from the Alps." Jean Habel follows with an article on the Andes of Argentina, narrating the results of a journey made in the winters of 1893–94 and 1894–95 (summer of course in that hemisphere) to explore the valleys that near the 33d parallel extend northward toward Aconcagua. No meagre phrases of the reviewer can do justice to the importance of this article for one who would know something of this region of exceeding grandeur. Even to one who may not read the text, the illustrations speak for the splendid alpine character of these peaks so near the southern tropic.

The *cultur-historisch* aspect of the Alps finds liberal expression in this issue. "The Relation of the Alps to Historical Movements," by Professor Ratzel, "The Alpine Folk-song and where to find it," a chat (*plauderei*) by Dr. Josef Pommer, containing notes and words of many hitherto unprinted songs, "Household Customs in the Burggrafenamt (vicinity of Meran)," by Karl Wolf, discuss at length these most interesting topics. Other articles are "Mountain and Glacier Trips in the Mont Blanc chain," by G. Euringer, "Notes on the Mountains of the Maurienne and the Tarentaise," prepared in collaboration by Dr. K. Blodig and L. Purtscheller (the pendant to a previous article in the issue of 1895), "The Höfats in the Algäu," by J. Enzensperger, "The Gurgler Ridge," by G. Becker, "The Langkofel Group," by O. Schuster, and "Strolls among the Steiner Alps," by the editor of the volume, to whom we extend our hearty congratulations.

C. E. F.

IRLANDE ET CAVERNES ANGLAISES. By E. A. MARTEL. Paris: Ch. Delagrave.

The ever active M. Martel has lately been giving his attention to the caves and subterranean waters of Ireland and England, and, with his extremely serviceable apparatus and his experience in investigating cave phenomena in other countries, he has succeeded in making a useful and valuable study. The limestones of Ireland are favorable to underground channels for the streams, and three important rivers make use of such beds, the Marble Arch near Inniskillen, the Cong in Galway and the Gort. All three were places of interest to M. Martel. In the Marble Arch investigations were conducted along passages aggregating more than a thousand feet in length. At times the explorer found himself under the vault of a great cave which rose above him to a height of forty or fifty feet, and at other times he followed a succession of conical chambers of considerable height whose connecting links barely sufficed for the passage of the gunwales of his boat. Many experiments were made in this district, the relations of other streams to the Marble Arch being shown by floating objects which were thrown into "cradle-holes" in the neighborhood. In like manner were carried on the investigation of the other two regions with like praiseworthy results.

M. Martel gave much attention to the marine grottoes, of which there are many on every coast of Ireland, and with a tourist's eye he examined other of the natural or artificial objects of interest, many of which, like the swinging bridge of Carrick-a-Rede, the Giants' Causeway, and the basaltic coast of Antrim, are Meccas for tourists. In England he was able to visit two of the important localities for caves, Derbyshire and Yorkshire, and with his customary energy and skill he presents interesting stories of their peculiar features. Of particular interest is his investigation of the Bagshaw cave, which in the local guide-books is given as having the extreme length of more than two miles. This he reduces to about three kilometres. The volume is a noteworthy addition to our knowledge of the caves of Great Britain, and in the novelty and character of the investigation is testimony to the skill and ability of Martel, who in the midst of a well known country has been able to come a stranger and ferret out facts that are new with reference to its caves and underground passages.

J. R.

BIBLIOGRAPHICAL NOTES.

"The Journal of School Geography" is the name of a new periodical with geographical interests, published by Prof. Richard E. Dodge and others in New York City. Its aim is to advance in every way possible the cause of geographical teaching in elementary and secondary schools, presenting the newest and the best information in such form that it may readily be of service to the teacher. With this idea the initial number, issued in January of the present year, contains an essay on "Home Geography," by Prof. W. M. Davis, notes of the geography of Africa, by Cyrus C. Adams, "Geographic Instruction in Germany," by W. S. Monroe, and editorial suggestions concerning the teaching of geography in grade schools. This excellent beginning has been followed by equally good articles in the other issues, Prof. Conway Macmillan contributing to No. 4 an account of the geographical distribution of plants, and William Orr, Jr., writing about the Connecticut Valley in No. 3, while praiseworthy selections of current notes and reviews of publications conclude each of the issues.

The Sierra Club Bulletin in the first number of its second volume presents an article on "Mount Lefroy, August 3, 1896," and a biographical sketch of Philip Stanley Abbot. Mr. C. S. Thompson, the author of the first-named, was one of the party with whom Mr. Abbot made this, his last mountain ascent; and the article, aside from being a tribute to the skill of the young leader, is another story of the unfortunate occurrence, giving evidence that the accident was not due to lack of precautions or to carelessness. The biographical notice is from the pen of Professor Robert Herrick, and is accompanied by a splendid portrait of Mr. Abbot. This issue of the Bulletin and that which succeeds it give proof of the activity of the members of the Club in the exploration of the mighty western mountain. Mr. Bolton Coit Brown contributes a continued article on "Wandering in the High Sierras," Miss Helen M. Gompertz presents a cheerful little sketch, "Up and Down Bubb's Creek," in which a camping party of half a dozen, four of them women, made some interesting ascents, while Mr. John G. Lemmon writes of the "Conifers of the Pacific Slope," and how to distinguish them. Each number of the Bulletin contains several excellent illustrations, many of them photographs from high altitudes.

The Bulletins of the Geographical Club of Philadelphia for last year contain two articles on the Venezuelan boundary, one by Joseph B. Austin and the other, with reference to the Schomburgk line, by Prof. Angelo Heilprin. The latest number is devoted to "A Trip to Manika Land," by J. Edward Farnum.

The Third Annual Report of the Forest Commissioner of Maine, the volume for the year 1896, is an interesting and creditable one. An investigation of the forest resources of the State was undertaken by Mr. Austin Cary; and as the outcome of this research, attention is called to certain misapprehensions which are current in the popular mind. Mr. Cary finds that it is not possible to take from the land a crop of timber every few years, and shows that the contrary idea, based on the supposition that the annual increase is very great, is a false one. The forests of spruce will, in his opinion, certainly be exhausted if present methods are continued, although in that of the Commissioner, Mr. Oak, it would be possible to cut even more than at present, under proper methods, and retain the supply practically intact. This conclusion is an important one, and it is creditable to Maine, with its present enormous areas of forests, that it is inclined to apply proper methods of forestry, and thus furnish an example to other States whose trees ought to be and still can be preserved.

The Scottish Mountaineering Club of Glasgow through its "Journal" gives evidence to the world of an active organization which has for its field the hills and mountains of Scotland. The Club and the Journal are both comparatively young, the latter being now in its fourth volume. The publication calls together the opinions of authorities, not only in matters of alpinism but of geography and geology as well, and on its pages there appear essays from men well known throughout the world. Sir Archibald Geikie notes in a recent issue the peculiar features of the Scotch mountains and explains why it is that they are so rough and rugged, giving additional strength to his remarks by excellent illustrations of typical forms in Skye and in Ross-shire. Professor G. G. Ramsay outlines in a serial, running through half a dozen numbers of the Journal, the rise and progress of mountaineering in Scotland, bringing his story to a logical close by a bit of the history of the formation of the Scottish Mountaineering Club itself. Numerous articles attest the sturdy quality of the Scotch hills, and among the correspondents "Auld Reekie" asserts himself and shows that Edinburgh, the modern Athens, "is no a pad place for hills and rocks whateffer," bringing proof that the Arthur Seat is a very nice little bit of a mountain scramble. The Journal is a neat quarto which makes its appearance three times a year.

The Club Alpino Siciliano, living under the shadow of Etna, is an active organization, accomplishing each year a considerable amount of work. Recently, as a means of setting this fact before the world, the Club has begun the issue of a quarterly magazine, "Sicula," which is published in Palermo. This periodical devotes itself to the studies that cluster about alpinism and geography, accepting geology as a division of the latter subject. Anthropology, geology, vulcanism, mountain climbing in its serious aspect, and outings are among the matters which are presented in "Sicula," making altogether an attractive and instructive magazine.

The Bollettino (No. 62) of the Club Alpino Italiano contains a rare tribute to the late R. H. Budden, President of the Florentine section of that Club and since 1883 a corresponding member of our own. An Englishman by birth, after wide travel in Europe he selected Italy for his place of residence, and here accomplished much for the cause of alpinism through his energetic leadership in the active society with which he became connected. He established cordial relations between his own club and those of other countries, and all mountaineers share in his loss with those of his adopted country. An excellent engraving of Budden serves for frontispiece to the volume. — Another important article is in memory of Emile Rey, the famous alpine guide, whose untimely death, at the head of a party in 1894, is so greatly deplored. Since 1877 he had been constantly in demand, and was the leader in more than fifty first ascents of peaks and summits in Switzerland. — A scientific expedition to Monte Rosa presents in the same number an account of its investigations. — Sinigaglia, whose "Climbing in the Dolomites" has been received with so much favor, contributes an account of his favorite mountains, the Dolomites of Ampezzo; and the Porro Brothers furnish this interesting issue with a study of the Gran Paradiso group.

The Turin section of the Club Alpino Italiano has recently completed its series of guides for the western Alps. This enterprise was begun in 1889 by Martelli and Vaccarone, active members of the section, who prepared a handbook to the Maritime Alps. Of the second volume of the Guides there are two parts, the first of which was prepared by Bobba and Vaccarone, and the second by the authors of the earlier volume. It concerns itself with the Graian and Pennine Alps, the second portion being devoted to the Valleys of Aosta, Biella, and Ossola. The volumes are carefully prepared, are remarkably full and detailed, and contain many most excellent maps. To one passing a little time in the Italian Alps the Guides will be invaluable.

" Le Alpi Illustrate " is the title of a new venture in alpine art, the first portion of which is to appear in July of the present year. The lack in Italy of a good series of alpine views representing the splendid mountains of the country is the reason for the enterprise, — a want that will be supplied if the plan meets with success. The responsible editor is Antonio Fusetti, of Milan, but the plates will be selected under the direction of the Club Alpino Italiano. They are to be etched on steel by means of photography, and the examples which have been submitted bear close inspection. It is proposed to issue each month a number of "Le Alpi Illustrate," which shall contain five views, with a brief explanation of each plate. The price is so reasonable that any mountain lover can afford to possess them, for they are quoted at a price little above that of an ordinary wood-engraving.

The Swedish Tourists' Club, appreciating the scenic beauties of its own country, has issued from time to time neat and authoritative guide-books to set forth their attractions. During the past year Guides No. 13 and 14 have been issued. The first of these, following the course of the Indals and Ångerman rivers, takes the traveller into northern Sweden, through a forest country the like of which is not easily to be found elsewhere in Europe. The district lies along the Gulf of Bothnia, some distance to the north of Stockholm, and the journey to it may be combined with a visit to the Jemtland, the land of waterfalls, or to Dalecarlia, so interesting to us through its connection with fiction and romance. The latest of the Guides devotes itself to Stockholm, and sets forth the beauties and attractions of this northern capital. All are profusely illustrated.

J. R.

Report of the Recording Secretary for 1896.

On January 1, 1897, the corporate membership of the Club was 908. The losses amounting to 83 and the accessions to 107, and three memberships having been revived, the net gain for the year was 27. The Honorary Members numbered 16, and the Corresponding Members 51, no changes having taken place. There were 86 Life Members, nine having deceased in previous years. The total membership was 975, a net gain of 27.

There were held during the year nine regular and three special meetings, and one field meeting, the average attendance being 94. Four of the thirteen meetings were held in the afternoon. At the meetings there were presented nine reports and twenty-four papers, of which twelve were illustrated with the lantern. There were also ten accounts of trips made during the winter excursion. A geographical classification assigns three papers to Greenland, three to Canada, three to California, two to Maine, two to Montana and the State of Washington, one to Mexico, one to Switzerland, and one to Massachusetts. Only one evening, with ten short papers, was devoted to the White Mountains, while, on the other hand, the whole eastern hemisphere was represented by only one paper.. The papers of a general nature have been unusually interesting and numerous.

The largest field meeting in the history of the Club was held at the Crawford House, White Mountains, N. H., July 3–11, and there was a successful camp at Moosehead Lake, Maine, in August. Accounts of these and other excursions will be found in the report of the Excursion Committee.

The Snow-shoe Section held its annual meeting in January. The season was not good for snow-shoeing near Boston, and there was little snow in the mountains till February. The winter excursion was to Upper Bartlett, N. H. The attendance was about 60, the weather was very fine the first week, the snow in excellent condition, and an unusually large number of mountain ascents were made.

The annual social meeting was held at the Hotel Vendome on Friday evening, February 14. One hundred and seventy-nine tickets were sold.

Two numbers of APPALACHIA have been published, — Vol. VIII., No. 1, in January, and No. 2, in November, both unusually well illustrated. The new edition of the Map of the Country about Boston was issued in the spring.

Attention is called to the reports of the various Councillors, which show considerable activity and much work accomplished.

The Recording Secretary regrets that it becomes his duty in this report to record the Club's first fatal accident in mountain climbing, the death of Philip Stanley Abbot, on Mt. Lefroy, Canadian Rockies, on August 3. An account of the accident and a biographical sketch of Mr. Abbot were published in the last number of APPALACHIA.

After ten years of sojourn in the old Ticknor Mansion on

Park Street, the Club has changed its domicile to the new Tremont Building, the rooms numbered 1049, 1050, and 1051. We now have commodious quarters centrally located and with a fine view, stretching from Big Blue to Prospect Hill (the highest elevations near Boston), and including the Charles River Basin and the State House. Our valuable and unique library is safely housed in a fire-proof building. The rooms are used for council and committee meetings, exhibitions, and small social gatherings; they contain the library and collections, and are, in short, the work-shop and official headquarters of the Club.

May the next ten years bring to us even a larger measure of prosperity and usefulness.

Respectfully submitted,
ROSEWELL B. LAWRENCE,
Recording Secretary.

Report of the Corresponding Secretary for 1896.

THE Corresponding Secretary and Librarian is pleased to announce that the library of the Club has maintained through the year the same excellent condition which was noted in the last report. The number of institutions which exchange publications with the Club has been increased by six, and now numbers 75. The number of publications received from them is slightly larger than heretofore. As in previous years, a few periodicals which cannot be acquired by exchange have been secured through the kindness of Mrs. J. H. Thorndike, who has contributed to a fund for the purpose. The accessions for the year are given in detail below, from which it may be seen that upwards of 100 volumes and pamphlets have been obtained by exchange or gift and 18 have been purchased.

From various sources, principally the United States Geological Survey, 36 maps have been added to the collection.

Gratifying progress has been made towards the completion of the series of sporadic papers treating of the White Mountains, the list of which was given last year in the Bulletin of the Providence Public Library. Many of the papers which were contained in the old magazines have been given to the library by Miss Isabel Batchelder, while recent bargain sales of Harper's and Scribner's have given opportunity to acquire many others. An account of these papers is not included in the numerical portion of this report, nor are they noted in the card catalogue of the library, since it will be more convenient to deal with the collection as a whole when more nearly complete.

From the University of Upsala the Club has received not only the publications of its department of Geology, but about fifty "separates," papers treating of European geology and topography; while from the Missouri Geological Survey eight volumes of reports have been received. An opportunity was afforded during the year to purchase the first four volumes of Petermann's Mittheilungen, now quite rare.

The new departments which were established last year — poetry and nature works — have been strengthened, and a number of volumes on exploration and popular accounts of mountain climbing have been secured.

The preparation the present year by the Boston Public Library of a list of the periodicals taken by the different libraries about Boston presents a comparative view which is quite interesting. It is gratifying to your librarian to find from the proofs of this list that the Club receives many periodicals not taken elsewhere in the vicinity.

The home use of the books is increasing; a number have been called for by members at a distance, necessitating their transportation by mail or express. In this, and in a number of other ways, it is evident that the library is becoming each year of more and more service to our members.

ACCESSIONS TO THE LIBRARY FOR THE YEAR 1896.

FROM CORRESPONDING SOCIETIES.

American.

Academy of Natural Sciences of Philadelphia. — Proceedings, 1895, Part 3; 1896, Parts 1, 2, 3.

Agassiz Association (Wilson Ornithological Chapter). — Bulletin, 4–8.

American Geographical Society. — Bulletin, XXVII. 4; XXVIII. 1, 2, 3.

American Museum of Natural History. — Bulletin, VII.; Report, 1895.

California Academy of Sciences. — Proceedings, V. Part 2.

Cambridge Entomological Society. — Psyche, 237–248.

Chicago Academy of Sciences. — Bulletin, II. 2; Geological and Natural History Survey, 1.

Essex Institute. — Bulletin, XXVI. 7-12; XXVII. 1–6.

Geological and Natural History Survey of Canada. — Report, VII.

Geological and Natural History Survey of Minnesota. — Bulletin, IX. Parts 8, 9.

Geological Survey of Missouri. — Report, IV.-VIII.

Geographical Society of the Pacific. — Examination into the Genuineness of the Jeannette Relics.

Geographical Society of Philadelphia. — Bulletin, II. 1.

Lick Observatory. — Publications, Vol. V.

Mazamas, The. — Mazamas, I.

National Geographic Society. — Magazine, VII.

New York Botanical Garden. — Bulletin, I. 1.

Oberlin College. — Laboratory Bulletin, 3.

Sierra Club. — Bulletin, I. 7; Map of the Sierra Nevada Mountains.

Torrey Botanical Club. — Bulletin, XXII. 12; XXIII. 1–11.

United States Department of Agriculture. — Reports and Pamphlets (14).

United States Department of the Interior (Bureau of Ethnology). — Report, XIII.

United States Geological Survey. — Annual Report, XV., XVI. 1–4; Bulletin, 123, 126, 128, 129, 131–134; Summary of the Primary Triangulation of the United States.

Foreign Alpine Clubs.

Club Alpin Belge. — Bulletin, 22.

Club Alpin Français. — Bulletin, 1895, 12; 1896, 1-11; Annuaire, XXII.; (*Section des Alpes Maritimes*) Bulletin, XVI.; (*Section Lyonnaise*) Revue Alpine, II. 1-12.

Club Alpino Italiano. — (*Direzione Centrale*) Revista Mensile, XIV. 12; XV. 1–11; Bollettino, 62; Cenno Biografico su R. H. Budden; Catalogo della Biblioteca.

Club Alpin Suisse. — Jahrbuch, XXXI. and Beilagen; Alpina, IV. 1-13; Les Cabanes du C. A. S. en Décembre, 1895, Courvoisier. (*Section Genevoise*) L'Echo des Alpes, 1895, 12 and Supp.; 1896, 1-11.

Club Alpino Siciliano. — Sicula, I.

Deutscher und Österreichischer Alpenverein. — Mittheilungen, 1895, 24; 1896, 1-23; Zeitschrift, XXVI., XXVII.; Register.

Kruimskiĭ Gornuĭ Klub. — Zapiski, 1895, 7-12; 1896, 2-10.

Magyarországi Karpat-egyesület. — Jahrbuch, XXII., XXIII.

Norske Turistforening. — Årbog, 1896.

Österreichischer Alpenclub. — Alpen-Zeitung, XVII. 24; XVIII. 1-24.

Österreichischer Touristen-Club. — Touristen-Zeitung, XV. 24; XVI. 1–24.
Scottish Mountaineering Club. — Journal, 19, 20.
Siebenbürgischer Karpathenverein. — Jahrbuch, XVI. and Beilage.
Società Alpina Friulana. — In Alto, VII.
Società Alpina delle Giulie. — Alpi Giulie, I. 1–6.
Società Alpina Meridionale. — Bollettino, IV. 1–4; Programma, 1896.
Société des Touristes du Dauphiné. — Annuaire, No. 21; Guides, Porteurs et Muletiers de la S. T. D. 1896.
Svenska Turistförening. — Årsskrift, 1896; Wegweiser, 12, 13; Ledamöter, 1895; Circular 15.

Foreign Geographical Societies.

Geographische Gesellschaft (Greifswald). — Jahresbericht, VI.
Gesellschaft für Erdkunde (Berlin). — Verhandlungen, XXII. 8–10; XXIII. 1–6.
Imperatorskoye Russkoye Geographitcheskoye Obshtchestvo. — Izviestiya, XXXI. 1–6; Otchet, 1895.
Instituto Geografico Argentino. — Boletin, XVII. 1–6.
Kais-königliche Geographische Gesellschaft (Vienna). — Mittheilungen, XXVIII.
Nederlandsch Aardrijkskundig Genootschap. — Tijdskrift, XII. 6; XIII. 1–5.
Royal Geographical Society. — The Geographical Journal, VII., VIII.
Sociedad Geografica. — Boletin, XXXVII. 7–12; XXXVIII. 1–6.
Sociedade de Geographia. — Bolletim, XIV. 4–12; XV. 1–4; Actas, XV.
Società Geografica Italiana. — Bollettino, IX.; Memorie, I.–VI.
Société de Géographie (Paris). — Bulletin, XVII.; Comptes Rendus, 1895, 14–16; 1896, 1–16.
Société de Géographie Commerciale (Bordeaux). — Bulletin, XVIII. 24; XIX. 1–22.
Société de Géographie Commerciale de Paris. — Bulletin, XVII. 12; XVIII. 1–11.
Société de Géographie de Tours. — XIII. 1.
Société Khédivale de Géographie. — Bulletin, IV. Parts 7, 8, 9.
Verein für Erdkunde (Leipsic). — Mittheilungen, 1895; Wissenschaftliche Veröffentlichungen, III.
Verein für Erdkunde an der Universität Wien. — Berichte, XIX., XX., XXI.

OTHER EXCHANGES.

Annalen des Kais-königlichen Naturhistorischen Hofmuseums. — X. 3, 4; XI. 1.
Nova Scotian Institute of Science. — Proceedings, IX. 1.
Revue Géographique Internationale, 239–251.
Société de Spéléologie. — Spélunca, I.; II. 1–3.
Sonnblick-Verein. — Jahresbericht, IV.

Teikoku Daigaku (Imperial University of Tokio). — Journal, VIII. 2; IX. 1.
Upsala Universitets Mineralogisk-Geologiska Institution. — Meddelanden, 1–13, 18–22; Pamphlets.
White Mountain Echo, 1896.

DONATIONS.

[Names of members of the Club are italicized.]

L'Avvenire della Colonia Eritrea. Leopoldo Franchetti. Gift of Author.
Glacial Deposits of Southwestern Alberta. *Geo. M. Dawson.* Gift of Author.
Plates illustrative of a Journal of a Tour in France, Switzerland, and Italy. Marianne Colston, illustrator. Gift of Herbert S. Porter.
Northampton: the Meadow City. *F. N. Kneeland* and L. P. Bryant. Gift of *F. N. Kneeland.*
Appalachia, Vol. VIII. Nos. 1, 2.
Register of the Appalachian Mountain Club for 1896.
The Highest Mountain Ascent and the Effects of Rarefied Air. *E. S. Balch.* Gift of Author.
Map of the Country about Boston, 1896 (mounted).
Map of the Country about Boston, 1896 (unmounted).
The New Meteorological Observatory on the Brocken. *A. L. Rotch.* Gift of Author.
The Voice of a Tree from the Middlesex Fells. Gift of *E. E. Norton.*
In Lynn Woods. Nathan M. Hawkes. Gift of *T. P. Nichols.*
Annual Report of the Trustees of the Public Library of Boston, 1895. Gift of Trustees.
Monthly Bulletin of the Boston Public Library, 1896, 1–9.
Trondhjems Turistforening. Aarsskrift for 1896. Gift of Turistforening.
The Gypsy Moth. Gift of Massachusetts Board of Agriculture.
Around the World. Odd numbers. Gift of *J. Ritchie, Jr.*
Dal Monte Rosa al Cervino. Cesare Fiorio. Gift of Author.
Descriptions of Some New Species of North American Mosses. Leo Lesquereux and T. P. James. Gift of *Miss I. Batchelder.*
Contributions to American Botany. Sereno Watson. Gift of *Miss I. Batchelder.*
Aspidium cristatum × marginale, Davenport. Geo. E. Davenport. Gift of Author.
Poems of Places. America: New England. H. W. Longfellow, editor. Gift of *Miss I. Batchelder.*
Mountaineering and Exploration in the Japanese Alps. Walter Weston. Gift of *R. B. Lawrence.*
A Summer in Leslie Goldthwaite's Life. Mrs. A. D. T. Whitney. Gift of *J. Ritchie, Jr.*
Outing, 1896. Gift of *Mrs. J. H. Thorndike.*

Royal Scottish Geographical Magazine, 1896. Gift of *Mrs. J. H. Thorndike.*

Alpine Journal, XVIII., Gift of *Mrs. J. H. Thorndike.*

PURCHASED.

The Mountain. Jules Michelet.

Daylight Land. W. H. H. Murray.

Across Thibet. Gabriel Bouvalot.

The Alps from End to End. *W. M. Conway.*

Handbook of Arctic Discoveries. *A. W. Greely.*

White Mountain Vistas. F. S. Mathews, illustrator.

Among the Northern Hills. W. C. Prime.

Spring Notes from Tennessee. Bradford Torrey.

The Alps of Arabia. W. C. Maughan.

Travels from France to Italy through the Lepontine Alps. Albanis Beaumont.

Petermann's Mittheilungen, 1855–1859.

Treasurer's Report for 1896.

In the year 1893, for the first time, the interest from the Permanent and Reserve Funds was used for expenses, instead of allowing it to accumulate. In the past year, for the first time, a part of the principal of the Reserve Fund has been withdrawn, thus using this fund for extraordinary expenditures, as was designed when it was established in 1887.

On three former occasions a general call has been made for subscriptions in addition to the yearly dues. In the years 1885–1888, $1129 was contributed to meet the cost of the room in Park Street. In 1888, $392 was collected to help build the Stone Hut on Mt. Madison, which cost $800. In 1893, $399 was contributed for purchasing the Sella Collection of alpine photographs. The recent call for assistance in paying expenses of our new rooms has met with a very generous response, but we really need more money in order not to be cramped in the Club work. The amount subscribed for the first year has been $339 from 98 members. It is very desirable that the amount be increased, and if any members feel it to be their duty to add their names to the list of subscribers we hope they will not neglect that duty.

Previous to 1896 the largest amount paid in any one year for publications of the Club was $1682 in 1890, when the Map of Vicinity of Boston was issued. For the five following years the average amount paid per year was $900. During the year 1896, $2418 has been paid for publications, and a considerable sum, impossible to estimate closely, will be required to complete the work undertaken.

The appropriations by the Council for the Departments the past year have been the usual amounts that our resources permit of. If we had more money they could well use more.

The growth of the Club has been nearly uniform, as a comparison of every five years will show: in 1876, 126 members paid admission fees; in 1880 admissions and assessments were paid by 272; in 1885, by 558; in 1890, by 648; in 1895, by 758; and in 1896, 816 payments were made for admissions and assessments.

The detailed account of receipts and expenditures and the tabular presentation of the same for the twenty-one years of the Club's existence is appended.

RECEIPTS.

Cash on hand, Jan. 1, 1896			$750.71
Life-Memberships: Ella J. Chandler, Mrs. F. H. Lee, Frances M. Abbott, F. E. Heald, Edwin H. Abbot, Edwin H. Abbot, Jr., 6 at $30			180.00
Trustees of the Reserve Fund:			
Withdrawn from the Fund			900.00
Admission Fees:			
From 102 new members at $5		$510.00	
Assessments:			
From 2 members for 1895			
" 692 " " 1896			
" 14 " " 1897			
708 members at $3		2124.00	
Interest:			
On Permanent Fund for 1895	$138.77		
" Reserve Fund " "	68.92		
" Treasurer's bank account, 1896	17.76		
		225.45	

Annual Reception :			
Received from the Committee		$4.97	
APPALACHIA and other publications.			
For sales in 1895 :			
APPALACHIA	$35.40		
Maps	27.47		
		62.87	
Donations :			
For Library, from Mrs. J. H. Thorndike	$10.00		
" APPALACHIA, VIII., 2, from E. S. Balch	20.00		
" Room	246.00		
		276.00	
Sella Collection :			
Sale of Catalogues at Boston	$7.80		
" " " " Northampton	9.00		
" " " " Lowell	2.10		
" " " " Rome, N. Y.	1.60		
		20.50	
Field Meetings and Excursions :			
Received from the Committee		50.00	
Room :			
Balance of key account at 9 Park Street	$4.75		
Chandelier sold from 9 Park Street	6.00		
Received for two Reunions	6.00		
		16.75	
Total Income			3290.54
			$5121.25

PAYMENTS.

Trustees of the Permanent Fund,			
For 6 Life-Memberships			$180.00
Postage and stationery		$142.93	
Printing and advertising	$116.62		
For Club Register for 1896	134.48		
		251.10	
Clerical services		248.00	
Expenses of meetings		180.05	
Library :			
For books and maps	$38.63		
" binding	101.36		
		139.99	
Room rent at No. 9 Park Street	$403.19		
Care, etc.	33.20		
	$436.39		

Moving to Tremont Building	$36.00		
Furniture and fitting do.	260.79		
Electric lighting do.	6.03		
Rent of 1049–1051 Tremont Building from Oct. 19 to Dec. 1	131.49		
Insurance to Oct. 29, 1899	1.53		
		872.23	
Appalachia and other publications :			
Vol. VIII., No. 1	$567.24		
Delivery, do.	82.00		
Vol. VIII., No. 2	451.61		
Delivery, do.	56.90		
Expense, business agent	50.00		
Map of the Country about Boston	435.57		
Walks and Rides round about Boston	248.50		
Maps for same	526.46		
		2418.28	
Department of Topography :			
Plane Tables, etc		40.99	
Department of Exploration :			
Exploration in Canadian Rockies		70.25	
Department of Improvements :			
Paths	$193.78		
Stove for Madison Spring Hut	34.05		
		227.83	
Department of Natural History :			
Thermometer for station at Plymouth, N. H.	$4.90		
Botanical supplies	3.71		
		8.61	
Department of Art :			
Photographs	$21.46		
Decorating Schoolroom	3011		
Sella Catalogues	6.25		
		39.01	
Donation to Trustees of Public Reservations		25.00	
Real estate :			
For travelling expenses and record fees in connection with title to lands		39.00	
Total expenses			$4703.27
			$4883.27
Cash on hand, Dec. 31, 1896		$111.98	
Room-fund (prepayments of subscription)		126.00	237.98
			$5121.25

Respectfully submitted,

JOHN E. ALDEN,
Treasurer.

The undersigned have examined the accounts of the Treasurer of the Appalachian Mountain Club for the year 1896. We find proper vouchers for all payments and have verified the cash on hand, amounting to ($237.98) two hundred thirty-seven and ninety-eight hundredths dollars.

We have examined the accounts of the Trustees of the Permanent Fund and the Reserve Fund for the year 1896, and they are correct.

The Permanent Fund amounts to ($3883.95) thirty-eight hundred eighty-three and ninety-five hundredths dollars, and accumulated interest to ($147.18) one hundred forty-seven and eighteen hundredths dollars, — together to $4031.13.

The Reserve Fund amounts to ($1323.19) thirteen hundred twenty-three and nineteen hundredths dollars, and the accrued interest to seventy-one and seventy-six hundredths dollars, — together to $1394.95; and the investments, as reported by the Trustees, have been verified.

Respectfully submitted.

GEORGE O. DAVIS,
GEORGE O. SMITH,
RUFUS A. BULLOCK,
} *Auditing Committee.*

BOSTON, January 12, 1897.

RECEIPTS FOR FIRST TWENTY-ONE YEARS.

Year.	Memberships.					Life Membership.	Sales of Appalachia and other publications.	Interest.	Annual Reception.	Field Meetings and Excursions.	Donations.	Total.
	Admission Fees.	Yearly Assessments.	Back Assessments.	Advance Assessments.	Total.							
1876	252.00	....	....	....	252.00	....	43.13	....	....	....	....	295.13
1877	50.00	254.00	8.00	....	312.00	....	98.00	....	....	....	....	410.00
1878	54.00	264.00	....	....	318.00	60.00	75.70	....	....	....	43.00	496.70
1879	148.00	256.00	40.00	4.00	448.00	....	130.85	1.90	....	....	221.70	802.45
1880	178.00	332.00	24.00	4.00	538.00	90.00	116.90	10.79	....	....	86.21	841.90
1881	222.00	384.00	18.00	12.00	636.00	120.00	141.40	17.59	....	....	62.55	977.54
1882	256.00	528.00	74.00	....	858.00	90.00	309.43	22.07	....	....	2.00	1281.50
1883	395.00	1000.00	20.00	27.00	1442.00	210.00	197.58	39.72	9.72	82.88	22.00	2003 90
1884	285.00	1059.00	21.00	9.00	1374.00	60.00	93.51	53.29	26.80	11.47	1.00	1620.07
1885	375.00	1212.00	69.00	12.00	1668.00	60.00	113.19	61.09	.45	70.73	534.50	2507.96
1886	426.00	1317.00	90.00	24.00	1857.00	330.00	247.94	88.62	12.50	124.35	364.20	3024.61
1887	385.00	1491.00	90.00	42.00	2008.00	180.00	183.80	79.34	10.00	40.20	114.00	2615.34
1888	355.00	1536.00	117.00	12.00	2020.00	180.00	67.06	42.52	9.20	45.94	754.76	3119.48
1889	655.00	1617.00	69.00	27.00	2368.00	120.00	93.85	151.29	11.48	....	127.60[1]	2872.22
1890	450.00	1620.00	24.00	15.00	2109.00	150.00	1168.13	217.12	3.73	....	220.85	3868.83
1891	500.00	1743.00	12.00	9.00	2264.00	120.00	354.28	182.54	....	146.27	20.00	3087.09
1892	560.00	1830.00	15.00	9.00	2414.00	300.00	625.22	130.29	....	70.58	.50	3540.59
1893	480.00	1908.00	6.00	....	2394.00	300.00	20.97	431.90	....	13.57	454.50	3614.94
1894	640.00	1968.00	9.00	12.00	2629.00	210.00	407.30	21.65	....	14.04	22.25	3304.24
1895	385.00	2016.00	6.00	12.00	2419.00	90.00	66.69	241.70	20.55	...	10.00	2847.94
1896	510.00	2076.00	6.00	42.00	2634.00	180.00	83.37	225.45	4.97	50.00	276.00	3453.79
Total	7561.00	24411.00	718.60	272.00	32962.00	2850.00	4638.30	2018.87	109.40	670.03	3337.62	46586.22

[1] Including $3.00 for keys.

EXPENDITURES FOR FIRST TWENTY-ONE YEARS.

Year.	Permanent Fund.	Reserve Fund.	Stationery, Postage, and Printing.	Appalachia and other Publications.	Department of Topography.	Improvements and Explorations.	Natural History and Art.	Clerical Expenses.	Expenses of Meetings.	Library.	Club Room.	Donations.	Total.
1876	....	....	109.91	140.86	....	15.00	....	....	....	....	....	....	265.77
1877	....	....	60.65	364.13	....	....	13.45	....	....	....	....	....	438.23
1878	....	....	202.31	169.80	2.00	20.00	52.48	....	....	....	....	....	446.59
1879	60.00	....	162 31	347.92	19.20	158.76	....	....	....	....	....	....	748.19
1880	90.00	....	186.17	318.13	19.00	72.60	....	....	....	....	....	....	685.90
1881	120.00	....	394.09	246.23	37.95	68.00	....	19.75	22.70	....	....	....	908.72
1882	90.00	....	258.99	675.93	25.40	....	....	34.50	25.00	....	....	....	1109.82
1883	281.72	....	389.73	366.27	23.65	160.37	....	67.41	1.38	69.78	....	....	1360.31
1884	113.42	....	382.49	1176.53	....	21.00	....	57.62	....	58.10	....	....	1809.16
1885	86.48	....	363.27	361.31	229.00	102.00	....	106.00	53.06	72.50	284.17	25.00	1682.79
1886	270.00	....	432.38	932.91	77.73	46.00	74.00	121.45	171.15	131.72	667.30	49.88	2974.52
1887	388.38	1000.00	289.38	566.71	538.97	123.02	20.12	107.12	145.45	102.50	504.81	....	3786.46
1888	280.00	100.00	473.95	597.59	....	779.55	8.32	49.50	93.45	120.56	456.12	....	2959.04
1889	220.00	114.70	390.77	1127.91	7.20	118.58	86.76	123.75	68.86	67.33	487.34	....	2813.20
1890	283.48	48.59	463.43	1682.95	....	46.07	101.56	181.00	58.35	96.06	464.95	....	3426.44
1891	305.64	605.71	389.27	833.17	50.00	123.00	45.36	191.50	121.60	117.10	471.69	105.30	3359.34
1892	399.56	200.00	438.72	1059.89	216.33	46.60	122.39	197.50	133.95	113.45	534.08	61.34	3519.81
1893	415.27	74.97	446.07	1086.18	....	684.15	664.45	221.95	203.70	59.10	576.04	25.00	4456.88
1894	214.00	....	398.49	947.59	....	228.75	74.48	236 80	194.14	89.66	540.28	25.00	2949.19
1895	90.00	79.22	402.75	571.57	164.43	205.35	109.78	249.75	157.05	128.56	493.90	25.00	2677.36
1896	180.00	[2]900.00	394.03	2418.28	40.99	337.08	47.62	248.00	180.05	139.99	855.48	25.00	4866.52
Total	3887.95	1323.19	7029.16	15991.86	1451.85	3355.88	1420.77	2213.60	1629.89	1366.41	6336.16	341.52	46348.24

[2] Decrease.

Report of the Trustees of the Permanent Fund for the year 1896.

PERMANENT FUND. — PRINCIPAL.

1896.			
January 1.	Deposit Suffolk Sav. Bank, Bk. No. 100,753	$1538.22	
	Deposit Provident Institution for Savings, Book No. 118,265	1182.58	
	Deposit Lexington Sav. Bank, Book No. 1921	1030.72	
	Deposit Eliot Five Cents Savings Bank, Book No. 32,233	91.20	
	Total on hand Jan. 9, 1896, per last account		$3842.72
	Amounts received from J. E. Alden, Treasurer, for Life-Memberships, during year:		
Feb. 18.	Ella J. Chandler	$30.00	
"	Mrs. Frances H. Lee	30.00	
March 28.	Miss Frances M. Abbott	30.00	
June 10.	Frank E. Heald	30.00	
Dec. 8.	Edwin H. Abbot	30.00	
"	Edwin H. Abbot, Jr.	30.00	
			180.00
			$4022.72
March 16.	Paid J. E. Alden, Treasurer, accrued interest during year 1895, as per vote of Council		$138.77
	Total Principal on hand Jan. 13, 1897		$3883.95

PERMANENT FUND. — INTEREST.

1897.			
January 1.	Interest on deposit in Suffolk Savings Bank, twelve months, to October, 1896, at 3¾%	$58.22	
	Interest on deposit in Provident Institution for Savings, twelve months to July, 1896, at 3½%	41.73	
	Interest on deposit in Lexington Savings Bank, twelve months, to October, 1896, at 4%	43.27	
	Interest on deposit in Eliot Five Cent Savings Bank, twelve months, to October, 1896, at 4%	3.66	
	Interest on deposit in Canton Ins. for Savings, three months, to October, 1896, Book No. 9015, at 4%	0.30	
	Total accrued interest during year		$147.18
" 13.	Total Permanent Fund, Principal, and Interest		$4031.13

Reserve Fund. — Principal.

1896.			
January 1.	Loan to the Massachusetts Loan and Trust Co.	$1414.19	
	Deposit in Five Cents Savings Bank	835.50	
	Interest on Loan to Mass. Loan and Trust Co.	42.42	
	Total on hand Jan. 9, 1896, as per last account		$2292.11
Feb. 20.	Paid J. E. Alden, Treasurer, accrued interest during year, per vote of the Council	$68.92	
Oct. 23.	Paid J. E. Alden, Treasurer, on account of principal, as per vote of the Council, April 16 and May 6, 1895, for the publication of the map of Greater Boston	600.00	
Dec. 31.	Paid J. E. Alden, Treasurer, on account of principal, and on account of the vote of the Council June 28 and 29, 1894, for a payment of $500.00 for the publication of Walks and Rides round about Boston	300.00	968.92
	Total Principal on hand Jan. 13, 1897		1323.19

Reserve Fund. — Interest.

1897.			
January 1.	Interest on Loan to Mass. Loan and Trust Co., twelve months, to Jan. 1, 1897	$39.08	
	Interest on deposit, Five Cents Savings Bank, twelve months, to October, 1896	32.68	
	Total accrued interest during year		71.76
" 13.	Total Reserve Fund, Principal and Interest		$1394.95

Total Permanent Fund, Principal and Interest	$4031.13	
Total Reserve Fund, Principal and Interest	1394.95	
Total amount in the hands of Trustees		$5426.08

Charles H. French,
Rest F. Curtis,
Isaac Y. Chubbuck,
Trustees of Permanent and Reserve Funds.

Report of the Councillors for the Autumn of 1896.

Natural History.

By Helen M. Tower.

The only accession during the past year to the Club Herbarium has been a large and valuable collection, consisting of more than five hundred specimens, received from Miss Mary A. Coe. Of these, 325 are mounted, determined, and classified. The remainder are mounted, but as yet not determined.

The E. H. Hitchings collection of North American ferns is very complete. It has been put in order by Miss Agnes W. Lincoln, who, with the assistance of others, has done most valuable work; to her in particular the hearty thanks of the Club are due.

The Councillor would take this occasion to call attention to the results of an inventory of the Herbarium. In it will be found Miss O. F. Dabney's gift of Teneriffe ferns; also ferns brought from Hungary, Rome, Sweden, England, New Mexico, and California, the gift of Mr. C. E. Ridler: all of which are in perfect order. It contains five botanical specimens from Mt. Washington, gathered by Dr. Farlow, and contributed by the late Mrs. J. R. Edmands. One hundred specimens of the California Flora have been received from Miss L. M. Hill. We have six mounted specimens from Mrs. Mary E. Loud, ten specimens given by Miss H. E. Freeman, and also Dr. T. Crozier's mounted specimens of the Rhus family. One finds, besides, fifty Southern flowers, chiefly from Florida, given by Miss H. F. Ayres, and fifty mounted specimens from England, Loch Lomond, and China, from an unknown contributor. Fifty exquisitely mounted flowers and ferns, brought from Palestine by Mr. R. B. Lawrence, are in a rare state of preservation and possess a special interest. Miss S. E. Cushman's local wild flowers are determined, but not mounted. Mrs. A. L. Davis's gift of thirty-two carefully selected and superbly mounted specimens of marine algæ will be a continual feast to all lovers of the beautiful.

The Herbarium includes but very few lichens, mosses, and grasses.

The Councillor is pleased to observe the steadily increasing interest in botanical study among our members.

In conclusion I would say that the request from the Plymouth N. H. Station for the replacement of the maximum thermometer has been complied with by your Councillor.

Reports of the Councillors for the Autumn of 1896.

Topography.

By Louis F. Cutter.

In the year just past the Department of Topography continued the work of supervising the printing of the "Map of the Country about Boston" for the Publishing Committee, until the maps were finished and delivered to the Club in April. The Publishing Committee having then requested the Councillor to prepare the sectional maps for the guide-book, patterns and titles were drawn, and on July 3 a contract was made with the Heliotype Printing Company for the printing of 4150 sets of maps at 7¼ cents per set. After some delay the sectional maps were completed in September.

In May the Councillor of Topography was advised by the Corresponding Secretary that the United States Geological Survey was about to issue a map of the country about Mt. Washington, to include the territory represented on the four New Hampshire sheets previously published, and that the officers of the survey would be glad to receive from the Club suggestions for the improvement of these sheets. Thereupon correspondence was begun with Mr. Marcus Baker, of the Survey, and with members of the Club who were known to be familiar with the several regions to be represented on the map. Replies were received from several members, and information was obtained by personal interview from others, and also from Professor Frank Goodwin, who is not a member. After a comparison of the Geological Survey sheets with earlier maps, and a perusal of papers in back numbers of APPALACHIA, the information collected was transmitted to Mr. Baker. While this work was going on the four published Geological Survey sheets were mounted together so as to form one map, which was hung in the Club Room for the inspection of members.

In June Mr. Philip S. Abbot, who was preparing for an expedition to the Canadian Rockies under the auspices of the Department of Exploration, sought advice as to the best way of mapping the snow fields which he intended to explore. The plane-table method was recommended to him, and the Department of Topography undertook to devise a plane-table small and light enough to be carried in a rücksack. Mr. Sturgis H. Thorndike kindly consented to supervise the construction of the instrument, and the Department is also indebted to him for suggestions as to its design.

The board of this plane-table, when open, is fifteen inches square. It folds in the middle, forming a portfolio for holding and protecting the sheet when it is carried in the rücksack. The folding tripod, for the sake of lightness and compactness, is made very low, no great disadvantage for use above the tree limit. The board is levelled by moving the feet of the tripod; there are no levelling screws. The weight of the plane-table proper is 3 lbs. 13 oz., and with the Gurley compass-sight alidade, two sheets of mounted paper, each 15 × 30 inches, the necessary drawing instruments, and the canvas carrying-case, which Mr. Abbot provided, it weighs less than six pounds. When folded and placed in the case with the above-named appurtenances it occupies a space of 15½ by 8½ by about 2½ inches. The whole can be carried conveniently, with other things, in a rücksack. This plane-table is now in the custody of the Department of Topography, and is available for the use of members of the Club.

The multiplication of paths on the northern slopes of Madison, Adams, and Jefferson having rendered necessary a new map of that region,[1] the Councillor early in July began work in the field, and extended westward the triangulation made by him in 1885 on Durand Ridge, so as to include Nowell and Israel ridges, the Castellated Ridge, and Mt. Bowman in a system of plane-table triangulation. Several of the paths were traversed and other measurements made, but the work could not, in the time at the Councillor's disposal, be brought to a stage that would justify publication. A moderate amount of work next summer, however, should make possible the publication of a useful map.

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[1] A part of this region has never been correctly mapped; certain features are inaccurately delineated on the U. S. Geological Survey sheets.

The triangulation and traversing above referred to were done with a Gurley traversing plane-table and a small Gurley compass-sight alidade, both purchased with funds from the appropriation for the Department of Topography. The plane-table board is 15 inches square and does not fold. It is provided with a three-inch compass-needle by which, in traversing, the board may be oriented. The tripod is light and has extension legs. There are no levelling screws, and the extension legs are a great help in levelling the board on the uneven rocks of the ridges and summits. When set up "low," that is, with the extension legs drawn in, this instrument is remarkably steady, and it is well adapted for triangulating above the tree-line or in open country. When set up "high" the table is not so steady, but still sufficiently firm for use in traversing. When taken apart it can be carried in the rücksack, but the legs of the tripod project from the mouth of the sack, unfitting it for use where real climbing must be done.

The instruments acquired by the Department, and now available for the use of members, may be enumerated as follows: —

1 small plane-table, very light and compact.
1 small light plane-table fitted with compass for traversing.
1 small compass-sight alidade.

The total cost to the Department of these instruments has been $39.75.

A few inquiries about topographical matters, from members of the Club and others, have been answered by the Councillor in the past year. This is a feature of the work of the Department of which members might well avail themselves more fully. Even when the Councillor cannot himself give the desired information, he can generally put the inquirer in communication with those who can help him.

Reports of the Councillors for the Autumn of 1896.

Art.

[The absence abroad of the Councillor of Art prevents the presentation of an official report for the Department for the year 1896. It has been thought best to publish the following items furnished by the Corresponding Secretary. The decoration of the room in the Hancock School, of which mention was made in the previous report, has been satisfactorily finished. Quite a number of additions have been made to the collections of the Club. A donation of photographs from Vittorio Sella has been received, as noted in the report of the Committee having this collection in charge; Mrs. and Miss Hollingsworth have presented a volume of Norwegian views; and several members have given to the Club the results of their photographic work during the summer and on the Club excursions. A series of Norwegian photographs and about thirty polychrome Swiss views have been purchased, and much unmounted material has been arranged in albums. — Ed.]

REPORT OF THE COMMITTEE ON THE SELLA COLLECTION.

The Committee on the Sella Collection is able to report a larger number of exhibitions in the year just closing, than in the one that preceded it, and congratulates the Club on the opening of new opportunities for the loan of these photographs under circumstances that will insure continued usefulness.

At the time of the last annual meeting a partial exhibit (more than half of the entire Collection) was in progress under the auspices of the Boston Camera Club. At about this time an interview with Mr. Charles Cutter, librarian of the Forbes Library at Northampton, Mass., and for many years a member of this Club, led not merely to an exhibition for two weeks under the auspices of that Library, but to such an extent did familiarity with the Collection impress Mr. Cutter with its value as a public educator, that he was moved to bring it to the attention of librarians generally through the columns of the Library Journal, and in addresses before the Massachusetts Library Club at Bridgewater and the American Library Association in its meeting in

Cleveland. The effect was immediately manifest in letters of inquiry received from various cities, and arrangements were made at once for the transfer of the Collection from Northampton to Lowell, where it was exhibited for eight weeks at the City Library, and, as at Northampton, was greatly appreciated. In the autumn an exhibition was given by the Jervis Library at Rome, N. Y. The librarian reports: "The pictures were very much enjoyed. They were appreciated even more than I thought they would be. The pleasure and education they were to the students of the Deaf-Mute Institute was worth the exhibition. . . . The Jervis Library Association and the people of Rome extend to the Appalachian Mountain Club their most cordial thanks for the loan of their valuable Collection." It is at present stored at the Jervis Library, awaiting the completion of plans now being made for its exhibition in Western cities.

Overtures for the loan of the Collection have been received from the Public Library at Denver and from the "Mazamas" of Portland, Oregon. The Committee is endeavoring, through the coöperation of members of the Club and others in Chicago, St. Louis, Minneapolis, and San Francisco, to arrange for a "grand tour" which shall include exhibitions in all these cities.

The Committee takes pleasure in reporting the gift by Mr. Sella of forty-one additional photographs, from his two series of 1894 and 1895. These are exclusively views taken in the Swiss Alps. Though of a smaller size than most of the pictures of the original Collection, they yield little to those in beauty and interest. An exhibition of these acquisitions will be made at the Club room during the present month. The Club has reason to congratulate itself upon the continued interest of Mr. Sella in this Collection, which won new laurels for him in his own country. The advancement of his name, which is made to-day, from the list of our Corresponding to that of our Honorary members, while motived by his intrinsic merits as a mountaineer, cannot but be voted with a greater cordiality in view of his many kindnesses to our Club.

Charles E. Fay,
Frank W. Freeborn,
For the Committee on the Sella Collection.

Report of the Councillors for the Autumn of 1896.

Exploration.

By Parker B. Field.

Encouraged by the success of the somewhat limited work of this Department in the summer of 1895, in the region of the Rocky and Selkirk mountains of British Columbia, our explorers spent the following winter in studying their notes of observations made at that time, and in planning a campaign for the coming season which should far exceed in magnitude any such work that the Club has ever done in the past. Supplied with the equipment of the year before, augmented by a number of new scientific instruments, the party, consisting of Messrs. Philip S. Abbot, Charles E. Fay, Charles S. Thompson, and George T. Little, left for the West in the latter part of July.

They had planned to accomplish some work in the region of the Glacier House, then returning to the Rocky Mountain range to reach the summit of Mt. Lefroy if possible, and to thoroughly explore the great snow field of the Waputekh range, which culminates in the fine snow peak of Mt. Balfour, which they also hoped to ascend. They had still other summits in mind, but their plans for these were less definitely formulated.

On July 28 Messrs. Thompson and Little ascended Ross Peak, but were unable to make important observations owing to the prevalence of dense smoke in the atmosphere. The trip occupied twelve hours. Though the mountain is not as high as several of its neighbors, the trip is interesting as being a first ascent.

On July 30 Messrs. Abbot, Thompson, and Little accomplished the first ascent of Rogers Peak, the highest of the Hermit range, the barometer indicating, on the summit, a height of 10,300 feet, and instruments showing a downward inclination of 1° to Swiss Peak, its neighbor, ascended in 1890 by Mr. Carl Sulzer for the highest of the range, though he became convinced of his error upon reaching its summit. This proved a very arduous trip, and involved twenty-two hours of steady work.

As full accounts of the ascent of both Ross and Rogers peaks are to appear in APPALACHIA, but a brief outline of the important details of the trips will be appended to this report.

Leaving the region of the Selkirks, the party went to Laggan, and after sending men and horses with camp equipment to the Upper Bow Lake, to prepare for the attack on the Waputekh snow field, they turned their faces, on August 3, toward Mt. Lefroy.

It is with deepest sorrow that the Club has learned of the sad calamity that befell the party on that fatal day. Here, within three hundred feet of the summit of Mt. Lefroy, Philip Abbot gave his noble life to the interest which he so dearly loved. The details are well known to us, but only time can bring us to a full realization of what we have lost in him both as a friend and as a fellow member of our Club.

Further plans for exploration were of course abandoned for the season, and the party turned homeward at once.

AT the meeting of the Club on December 16, at which the foregoing report was presented, the President read the following letter, which it was then unanimously voted to have printed in APPALACHIA as an appendix to the report of the Councillor of Exploration: —

CAMBRIDGE, December 15, 1896.

ALBERT S. PARSONS, ESQ., President of the Appalachian Mountain Club.

MY DEAR SIR, — I have waited for a fitting opportunity to place upon your records some expression of the admiration which we feel for the way in which my son's companions, Professor George T. Little, Mr. Charles S. Thompson, and Professor Charles E. Fay, acted when Philip died upon Mt. Lefroy last August. I do not know how to accomplish my wish better than by transmitting to you the contents of a letter written me last September by a gentleman living in New York, who was at that time wholly unknown to me and who also never had met my son. He chanced to be at Lake Louise about the time of the accident and personally knew its details. He speaks of meeting them there and then continues: —

. . . "I am almost certain, however, because of the modesty of these gentlemen, you do *not* know the extent of their devotion to your son, their indefatigable courage and exertions for the recovery of his body, in the face of their sorrows and the difficulties to be encountered in its accomplishment; or can realize what those difficulties were, quite so well as one upon the ground at the time.

"I wish to testify, as an outsider, to that heroic and tender devotion of these gentlemen to their dead comrade, and to the trying labors performed, notwithstanding the many distressing impediments, in order that his body might be restored to his family. It seems to me his family should know of this, if they do not; and this is my excuse for addressing you at this time, if my letter should seem obtrusive.

. . . "You may rest assured, as to his surviving companions, that *everything* was done which thought, affection, and labor *could* do, after the accident happened."

The fact that the conduct of these gentlemen so deeply impressed one who was to them a stranger, that he felt it his duty to make what he saw known to Philip's family, is more eloquent than any words from me. It is right that the Club should know how gallantly these faithful friends performed their duty to their companion; for it is one of the comforts we have to know that his last days on earth were spent in such company.

I would not pain the modest feelings of these gentlemen by undue publicity, but their fellow members ought to know what honor they did to the Club; and I will leave to your discretion to decide how best to inform the Club in this matter.

I am, with great respect, yours faithfully,

EDWIN H. ABBOT.

ASCENT OF ROGERS PEAK (SELKIRKS). BY PROFESSOR GEORGE T. LITTLE.

THE first ascent of Rogers Peak, the highest mountain of the Hermit Range, was made on Thursday, July 30, 1896, by Philip S. Abbot, with Charles S. Thompson and George T. Little. The party started from the Glacier House at 5.30 A. M. on a hand car, which was left near Rogers Pass station an hour later. Mr. Abbot chose for the line of ascent the west side of the brook that brings down to Bear Creek the contribution of the glacier lying between Grizzly and Rogers. Aside from a bit of partially cleared land at the outset and a belt of burnt timber toward the end, the steep climb of the first hour was through a characteristic Selkirk forest, a luxuriant growth of evergreen trees fairly free from the annoyance of undergrowth. The green timber was left at an altitude of 5125 feet, and the course soon passed on to a rocky slope so swept by spring avalanches that few, if any, trees could hold their footing. At 8.45 lunch was taken on the lower edge of a charming strip of greensward (alt. 6600 feet), that commanded a wide outlook to the south.

After a halt of twenty-five minutes, the ascent was continued, the course bending somewhat to the right but keeping on the Grizzly side of the valley. At 10.30 (alt. 7250 feet) a moment's rest was taken on the moraine of the glacier, and at eleven (alt. 7700 feet) the last rocks were passed, the party roped and took to the snow, turning the course still more to the east. Twenty minutes were given to photographing, and three quarters of an hour was spent in reaching the foot of the sharply defined final peak of Rogers. Here the rope was taken off, and the remainder of the climb, save at the very end, was over rocks or up scree-filled gullies.

The end of the side arête at an altitude of 9500 feet was reached at 1.25 P. M. The roughness of the main arête, broken frequently by gendarmes, made progress extremely slow, and at 2.20 a second lunch and a halt of forty minutes was taken under an overhanging rock. The temptation to take to the snow slope, which was temptingly near, was steadily resisted by the leader, who felt that the danger of snow slides on its steep surface, softened by the rays of the sun, was too great to be assumed. A bergschrund extending across the slope and visible from the Glacier House added to the force of his prudent counsel. The roughness of the rock climbing is indicated by the fact that two hours were spent in ascending an altitude of five hundred feet. The steepness of the arête increased rather than diminished, until, a hundred feet or more from the summit, the col connecting it with Swiss Peak was crossed, and the adjoining snow slope was followed to the top. The summit, reached at 5.10 P. M., was entirely covered with snow, only a jagged, blackened ridge of rock jutting out towards the south. The altitude according to the aneroid barometer was 10,300 feet. The clinometer showed the cairn on the summit of the Swiss Peak, erected by Sulzer in 1890, to be one degree lower.

At 5.25 P. M. the descent was begun. The temperature had fallen sufficiently to render it safe to descend by the southern snow slope, despite its steep incline. The bergschrund was successfully crossed at a point where its upper lip and a projecting spur from the lower came near enough together to permit the party to straddle the sharp narrow edge of the latter and so reach the farther side. Beside fifteen minutes given to supper, a brief halt was made in the amphitheatre formed by the projecting arêtes from Rogers and Swiss peaks. The névé soon became glacier. At 7.35 the point reached by Messrs. Abbot, Fay, and Field the previous year was passed. Nearly two hours were spent in crossing the depression through which the glacial streams flowed, and the forest was entered at 10 P. M. (alt. 6000 feet). Four wearisome hours, interrupted by frequent halts, intervened before reaching the Rogers Pass station. A leader less gifted than Mr. Abbot could not have guided the party through the blackness of the forest and down the rough mountain side. A four-mile walk on the railroad track seemed perfect ease after the struggle with the twenty rods of fallen timber that preceded, and the Glacier House was reached at 4 A. M. on Friday.

Ascent of Ross Peak (Selkirks). By Charles S. Thompson.

On Tuesday, July 28, Professor George T. Little and Charles S. Thompson ascended Ross Peak, a subordinate member of a group of mountains in the Selkirks to the north and west of Mt. Bonney. The party left the railway two and a half miles below Glacier House at the western end of the second "loop" trestle. From the eastern end of the trestle the peak is prominently visible beyond three intervening shoulders, a sharp almost perpendicular rock face apparently ending a long forest-clad ridge. Care should be taken closely to follow the top of this ridge, as there is a slight depression beyond the first shoulder (5300 feet), by this course most readily crossed and with a minimum of descent. The top of the ridge overlooks on the left a long line of cliffs increasingly high as one advances, and presenting wonderful and beautiful views of the Valley of the Loops, Mt. Afton (l.), Lily Glacier, Mt. Swanzy, Mt. Bonney (r.)). Tree-line was approximately reached near an "alpine garden" on the top of the second shoulder. Above the garden came a sharp scramble up a steep grass slope, much broken by protruding ledges, to the top of the third shoulder, a careful walk across an intervening knife-edge, and a traverse across the western (r.) face of the peak to the saddle which separates it from a rounded summit of equal height lying on a continuation of the ridge to the southwest. Three much higher summits appeared beyond in the direction of Mt. Bonney. From the saddle the ascent of Ross Peak, over or around great boulders, was both simple and easy. The party remained on the summit (7620 feet) from three until a quarter of four, and then descended into the snow-filled valley west of the ridge and north of the unnamed higher peaks above mentioned. With proper equipment of shoes and ice-axes a quick and exciting descent might have been made. Without that equipment the descent was necessarily slow and cautious. Near the lower end of the snow a traverse was made across the northern (r.) face of the ridge and the line of ascent was regained near the top of the first shoulder. The railway trestle was crossed on the return at eight o'clock.

Smoke from forest fires prevented a good view. The outlook from the summit is probably not so fine as that from Mt. Abbott, for the long uninteresting ridge of that mountain largely hides Sir Donald and the Illicilliwaet Glacier. The ascent, however, over an easy gradient, through a virgin forest, dense above, free from underbrush below, with picturesque mountain views over the cliffs upon the left, surpasses in every respect the usual route up Mt. Abbott. The view down the cliffs from the knife-edge, a clear, smooth chute of thirty-seven hundred feet inclined at an angle of 70°, is in itself worth the trouble of the climb.

This expedition is recommended to ladies. All could reach the alpine garden; many would be contented with nothing less than the summit. To climbers desiring new things the farther peaks offer two or three of the few "firsts" now remaining within a day of Glacier House.

Report of the Councillors for the Autumn of 1896.

Improvements.

By Frederic Endicott.

The paths on the Northern Peaks, including Lowe's path, the "Air Line," and Castellated Ridge path, were repaired in June, in part by Laban M. Watson and in part by Vyron D. Lowe. The path to the Ice Gulch was also put in order. A new cooking range has been placed in the Madison Hut and some repairs have been made around the building.

The path to the Pond of Safety was inspected in the same month, but, as it did not appear by the records to belong to the Club, nothing was done upon it. As it has now been adopted, it will next year need to be cut out. A number of guide-boards will also be required.

The Carter-Moriah path was thoroughly repaired throughout its whole length about the first of July, by Vyron D. Lowe, and the camp on Imp Mountain was rebuilt. No report of its use has been received by this Department. The Carter Notch camp was reported to be in good condition by a person who had used it.

As the Field Meeting was to be held at the Crawford House, the Mt. Willey path was cleared out; but the ice of last spring had gullied out the portion along the brook, and that section was not made so good as could be wished. Mr. Merrill of the Crawford House contributed the axemen for this work. A party who made the ascent by the southerly bank of Willey Brook think that that route is easier than the Club path, and say that water can be found much nearer to the summit. The rise from the railroad is one hundred feet less. Mr. Merrill also had a path cut from the Crawford House to the top of Mt. Webster, and, later in the season, a branch from the Webster path near the Silver Cascade brook to the summit of Mt. Jackson.

The Passaconaway path has been cleared out and the camp rebuilt.

The Livermore-Waterville path was in good condition at the beginning of the year. The Black Mountain (Sandwich Dome) path was repaired by the Waterville Athletic Association, and the small expense paid by our Club. The path on Mt. Carrigain needs some cutting and marking, especially on the lower part of the mountain.

For reasons given last year no work has been done on the Twin Mountain path.

Record rolls have been renewed as follows: On Mt. Adams, by Mr. R. C. Larrabee; on Black Mountain (Sandwich Dome), by Miss E. C. Willard; on Mt. Moriah, by Mr. Charles A. Stone; and on Passaconaway, by Mr. J. S. Pray. A record bottle (which should be replaced by a cylinder) was placed on Mt. Jackson by a party from the field meeting, and a new cylinder and roll upon Mt. Willey, the old cylinder being found defective.

Report of the Room Committee for 1897.

In its report about two years ago the Room Committee called attention to the fact that within a short time it would be necessary for it to consider whether to let the members use the room and store the books, or keep the books and close the room to members. Since that time a new bookcase had served to still further fill the room on Park Street. The problem has lately been solved, and the Club is now at home in its new rooms, 1049–1051 Tremont Building.

The probable excellent outlook to be secured from the Tremont Building, then in course of construction, induced the members of the Room Committee, together with the President and Secretary of the Club, to make inquiries as to the possibility of finding rooms in it suited to the needs of the Society. An Appalachian trip over bare beams was made by this party to the present location while it was still open to the sky, and the situation was deemed advantageous. As soon as the plans were ready, arrangements were made to secure the rooms, the original ideas of the architect were modified, and an effort was made to have the apartments as well suited as possible to our needs. On October 19 the keys of the new suite were delivered to us, and the same week the removal was effected.

The new rooms of the Club are in the tenth story of the Tremont Building, and comprise a suite parallel to the Tremont Street face of the building, but bounded by the central well. The rooms have a southerly and a westerly exposure. Three rooms of the original plan have been finished as two, a large reception-room and a smaller library,— the latter, however, of the same area as our single room in the Ticknor mansion. The windows in the library are so arranged as to permit of the placing of the books in alcoves, which are well lighted, and one of which already presents a cosy window-nook in which to enjoy the latest bit of literature. The window-seat is well patronized. The library is fitted for meetings of the Council and committees. Here is placed the large table from the old room, and closets furnish storage for the publications which are on sale.

The reception-room is a large apartment lighted by three windows. The southerly one, which is a broad bay-window, has been fitted with a platform and a long, cushioned window-seat, which follows the bend of the bay. This seat provides storage place for the rolled maps, which are so unsightly when stacked in a corner, but its principal purpose is to permit one to look in comfort at the view. The map-cabinet and pictures have been placed in this room; and the latter, in their new light and environment, have taken on added interest, and suggest themselves as strangers to many who have known them for years in Park Street. Some new furniture — a centre table, a convenient ladies' desk for the benefit of the custodians or those who wish an opportunity to write a letter, wooden chairs of antique pattern and tint, and rocking-chairs — serve to make the room at once comfortable and homelike. It is but fair to say, however, that the furnishings are not as yet completed, since the removal has taken place near the end of a financial year, when each of the many departments of the Club has expended the sum allotted to it, and the Treasurer cannot be expected to make large payments for a matter not in the budget. It is hoped, however, to complete the furnishing, including a suitable rug for the reception-room, quite early in the coming year.

The present rooms form a comfortable and dignified home for the Club. They afford to the library a housing and a display commensurate with its importance, and provide for its safety through the fireproof character of the building. The space at our disposal will provide shelf room adequate to the growth of the library for some years to come.

A description of the new rooms should take some note of the view from the windows. The great bay-window affords an outlook extending from the Blue Hill range almost to Prospect Hill in Waltham. The pleasanter portion of our city lies in the foreground, with a group of towers, those of our Back Bay churches, which in picturesque effect is hardly to be surpassed. A circle of hills skirts the horizon,—a pleasing line of elevations and depressions, the former crowned by sightly towers and residences. In the middle distance lies the Charles River Basin, crossed by the bridges, while the view to the west terminates in the gilded dome of the State House. The view is a noble one, eminently such as befits a mountain club.

That our members appreciate our improved conditions is evident from the record of visitors; for, in spite of the lack of keys for distribution, and with the room open only in the afternoon, the average attendance has been eight or ten times that at the room on Park Street. Of course some of this attendance is but the result of that spirit in man which makes a new toy the most attractive; but sufficient time has now elapsed for this feeling to have worn away to an extent, yet the visits to the room maintain their average. Thus far, upwards of two hundred members have visited the rooms; but the Room Committee hopes that this report may make still others anxious to see for themselves the nature of the improvement.

Certain practical advantages of the change are worthy of mention. One is, that with two rooms there is an opportunity for the Council or the various committees to hold meetings without the necessity of closing the rooms to members. Then, again, with the increased space and proportionate increase in seating appliances, the new rooms may be used for minor gatherings of Club members, such as the Snow shoe Section, which, with its fifty or more in attendance, has heretofore been sorely cramped. We can now seat about sixty persons upon chairs, stools, and the window-seats, which are always available for the purpose in the new suite. The lighting of the new rooms by means of electricity makes them attractive in the evening, and the fact that they are accessible by elevator up to ten o'clock renders them available to those whose business engagements prevent attendance during the daylight hours, and thus it is hoped in many ways to have the rooms and the library more valuable to our members than heretofore.

There is further the opportunity for small evening meetings and exhibitions, — in fact one such is now under consideration, that of the new Sella photographs. On a previous occasion the members were invited to inspect the rooms informally. These pictures will again afford an opportunity for members and their friends to come to the rooms, the latter that they may learn of the work of the Club. The room is open daily, excepting on the afternoons of regular meetings, from 3 to 5.30, under the care of volunteer custodians.

JOHN RITCHIE, JR.,
For the Room Committee.

Report of the Excursion Committee for 1896.

THE chief event of the year has been the annual Field Meeting held at the CRAWFORD HOUSE July 3 to 11. Mr. H. N. Shepard was chairman of the Committee of Arrangements, assisted by Messrs. J. Allen Crosby and George D. Newcomb, Mrs. Charles H. French and Miss Charlotte M. Endicott. It was the largest field meeting ever held by the Club, having been attended by one hundred and fifty-one persons. A complete account of the proceedings at the sessions has appeared in the November number of APPALACHIA.

On Saturday, July 4, seventy-five members of the party started at 9 A. M. for MT. AVALON, and after a pleasant walk, and for the last hundred feet a hard climb, reached the top, but found the view cut off by fog. Returned in time for dinner. Some pleasant short walks were taken in the afternoon.

On Monday fifteen of the party started immediately after breakfast for a tramp up the Crawford path to the summit of MT. WASHINGTON, and about fifty went up by train. After dinner on the summit most of the party went down into Tuckerman's Ravine, while twelve returned by the Crawford path to the Crawford House. The day was foggy and wet. The remainder of the party stayed over night on the summit, and came down by train Tuesday morning, except about twenty, who walked down by the Crawford path.

Tuesday was warm and fine. In the morning many of those who had not ascended Mt. Washington walked to the Cascade, Willey Brook bridge, and Willey House.

Wednesday was a grand day, very clear. About eighty members took the 8.30 train for Sawyer's River station. At this point they transferred to flat-cars and proceeded up the Lumber Co.'s road to the mills of Mr. Saunders, whose guests they were that day. Here the party divided, — some remaining at the mills, while the rest took the pleasant three-mile walk to the base of MT. CARRIGAIN, where commenced the hardest climb of the week; but the fine view from the summit amply compensated for the toil of the ascent. The return from the mills to Sawyer's station was on cars loaded with new lumber. The Crawford House was reached at 7.30 P. M.

Thursday twenty members started at 9 A. M. for MT. WEBSTER. A fine path and easy, rolling, up-hill climb. Long will the members there present look back on that day, for on the top of Webster they sat long pleasant hours looking off into the grand field of vision. After lunch two small parties went down the face of Webster to the carriage road in the Notch. Some came back by the same path, while others went to Mt. Jackson and returned from there to the house.

Friday was very clear and warm. Started at 9 A. M. for MT. WILLEY. At Willey brook bridge the party separated, a part going up Willey brook and over the shoulder of the mountain to its summit, while the rest went down to the path which starts up the mountain from near the railroad track. It was a fine day and a grand tramp. The party took up a new A. M. C. cylinder to replace the old one on the summit. In the afternoon some of the Mt. Willey climbers, with others from the hotel, ascended Mt. Willard, saw the sunset effects in the Notch, and watched the changing lights on the mountain.

Saturday, July 11, the party returned to Boston.

There have been during the year four other excursions, one of which was a camping party; also one all-day harbor excursion.

First was the winter trip to BARTLETT, N. H., February 21 to March 9, under the auspices of the Snow-shoe Section, led by their Committee, Messrs. R. B. Lawrence and W. R. Davis. During the first week the weather was very cold and dry, and the snow about three feet deep, — conditions most favorable for snow-shoe tramps. Ascents were made to the summits of Mts. Willard, Carrigain, Langdon, Silver Spring, Parker, and Bear. On February 23 an all-day tramp was taken up the Mt. Washington River Valley. On the 26th three of the party climbed to the summit of Mt. Washington. At the end of the first week came rain and heavy floods, but during the second week Table Mountain and Mt. Tremont were ascended, and there were sleigh rides to the Goodrich and Jackson Falls. The quarters at the Cave Mountain House were most comfortable, and the whole trip afforded a most delightful experience of winter sports in the mountains to the fifty-six members who attended.

Next in order was the Decoration Day Excursion to TAMWORTH, N. H., and Mt. Chocorua, May 29 to June 1, conducted by Mr. and Mrs. Parker B. Field. The party numbered fifty. On the evening of arrival at Tamworth the members assembled in the Town Hall to discuss plans for the trip and to listen to readings. Mrs. W. R. Davis read, "*A Night Alone on Chocorua,*" by Frank Bolles, and Miss Charlotte M. Endicott read, "*The Brook Path to Chocorua,*" by John Coleman Adams. Both were highly appreciated by the audience, describing, as they did so well, the work for the next day.

On Saturday morning carriages were taken for the base of MT. CHOCORUA. The ascent was made by the Brook path, quite slowly, so as to give opportunity to enjoy the beauty of the rushing stream beside the path, as well as the magnificent view of the cone of Chocorua. At 1.20 they reached the spring below the cone, just three hours and fifty minutes from the carriages. After lunch at the spring the cone was ascended in ten or fifteen minutes. The view was sublime, the atmosphere being clear beneath the low-hanging clouds. Frequent views of Mt. Washington were obtained. The passing showers were interesting as they pursued their way from Whiteface and Passaconaway over Carrigain and the Crawford Notch and thence northward over the Presidential Range.

At 2.30 nine of the party returned to Tamworth by the Liberty path, while the main body spent the afternoon on the summit. Fifteen walked out on the great northern spur, where, from an overhanging cliff, was obtained the grandest of all views of this noble peak, with its steeply sloping ledges descending a thousand feet into the valley below.

The night was passed at Knowles's Hotel at the base of the cone. Colored fires were burned at 9 o'clock, which were responded to from Tamworth. The party rose at 3 A. M. on Sunday to see the sunrise, but the view was short, owing to settling clouds. At 8.30 all but eight of the thirty-four who passed the night on the mountain commenced the descent, the eight coming down in the afternoon. The day was cloudy and damp.

On Monday, which was fine, the party returned to Boston.

On June 17 occurred the all-day HARBOR EXCURSION, planned and carried out by Captain Julius A. Palmer, in which fifty-seven persons participated. The party landed at Boston Light and at Fort Warren, lunching at the latter place.

The Camping party, arranged by Mr. A. R. Bailey, left Boston August 8 for MOOSEHEAD LAKE, numbering twenty-eight. Sailing up the lake in the late afternoon, a fine view was obtained of Mt. Katahdin, clearly defined in the distance, and radiant with delicate pearl color, all the other mountains being in deep shadow. It was a rare picture.

Next morning seven enthusiastic members rose early and climbed MT. KINEO — 750 feet above the lake — before breakfast. At noon twenty-three of the party embarked on board steamer "Kineo" for "M'seepswallenaik," Little Duck Cove, thirteen miles up the lake, where for the next two weeks they were to dwell under canvas. Before night eighteen tents were pitched under the forest trees. Many of the following days were occupied with canoeing, walks through the woods, and sylvan tasks of various kinds.

Monday night many meteors were observed. One hundred and sixteen were counted. Rest at night was broken by the unaccustomed calls of loons and owls. On Tuesday three members ascended Little Kineo, over much fallen timber.

Wednesday the five members of the party who had remained at Kineo House visited the camp.

Friday the entire party of campers made an all-day trip by steamer to Norcross brook, Northeast Carry, Northwest Carry, the old Camp ground, Williams stream, and Socotean River.

Campfires were fully attended every evening, varied occasionally by bonfires on the beach, with rockets and Roman candles to enliven the scene.

On Sunday, August 16, the party steamed up to the Tomhegan River and took dinner at the old Camp. On the return in a driving rainstorm the steamer ran down under the cliffs of Mt. Kineo, past Pebble beach, and thence back to camp.

Wednesday, August 19, the whole party embarked for Spencer Bay, where seven members landed to make the ascent of SPENCER MOUNTAIN

(Kokadjo). They reached the summit at 3.10 P. M., the first A. M. C. party that ever ascended this peak. The view was grand, — of mountains, lakes, forests, and rivers, with Mt. Katahdin far to the eastward the most prominent object in sight. After a stay of forty minutes they left the summit, and in three hours reached Spencer Bay and the steamer. Meantime the main body had crossed the lake and spent the day on the beautiful Moose River, where they were taken on board again, and camp was reached at 9.30 P. M.

On Thursday ten of the party climbed Little Kineo from the west side and obtained a fine view from the summit.

Friday a rough trip to the Socotean Falls. Back to camp at 5.30. A festive evening around a campfire, ending with fire balloons and red fire on the beach.

Sunday, August 23, the party broke camp and steamed down the lake with tents, baggage, and camp equipage in tow to Kineo House, which was reached only after a very rough passage, and on Monday, the 24th, they returned to Boston.

The Autumn Excursion to WATERVILLE, N. H., October 8 to 17, was conducted by Messrs. C. C. Hall and G. D. Newcomb, and was attended by sixty-one persons.

On Friday, the day after their arrival at Waterville, the party walked to the Cascades, about a mile and a half from the hotel, returning by the longer route through "Swazeytown." A good volume of water was pouring over the three falls, making the scene very attractive.

On Saturday a large number started to ascend MT. OSCEOLA, a part going only to the "First Outlook," a mile and a half from the house, and several others three and a half miles to the "Second Outlook," while thirty-three climbed to the summit, and entered their names on the A. M. C. roll there found. Osceola is covered with trees of large growth nearly to the top, which is 4350 feet above sea level. The summit itself is clear, affording a very extensive view, which on that day was exceptionally fine. No one who was there will easily forget the fascinating picture presented by the Presidential Range, white with snow, while every other peak was bare except for a few patches on Lafayette and Moosilauke.

On Monday, a cool and windy day, the ascent of BLACK MOUNTAIN (3999 feet above the sea) was undertaken by thirty of the party. After a steep climb through the woods to Noon Peak, where the wind swept the ledges with great force, nine members returned, while twenty-one pushed on two miles farther to Sandwich Dome, — the summit. The entire ascent was accomplished in about three hours. The snow, which on Saturday had presented so beautiful an appearance on the Presidential Range, had quite disappeared, but the view toward these mountains was still most satisfactory. Here, also, the Club cylinder was found, and a list of the climbers placed therein. A decided haze toward the south obscured Lake Winnepiseogee, but in other directions the sky was clear.

Next day, the weather being threatening, no Club walk was attempted, but many visited various points of interest as individual fancy prompted. In the evening came the ever memorable husking-party in the big barn, which was largely attended.

On Wednesday, October 14, the rain came in earnest, compelling resort to indoor amusements, of which bowling formed a goodly part.

MT. TECUMSEH (4008 feet) invited an ascent on Thursday, and eighteen members climbed its slippery sides, and ate lunch on the summit. The day was cloudy, but the clouds were high and with many openings, so that the effects of light and shadow on the world below were very pleasing. As on the other mountains, so here, there was no difficulty in finding the A. M. C. cylinder, and names were duly recorded.

On Friday, the 16th, the walk to DAVIS PARK and the GREELEY PONDS was taken. The Park lies some five or six hundred feet up the side of Osceola, about two miles above Elliott's. It is a beautiful spot with a sparkling brook running through it, and with a large number of big boulders, covered with ferns and mosses, distributed around. An hour was pleasantly passed here. The party then proceeded up the valley of the Mad River into the Notch between Mts. Kancamagus and Osceola. At the first Greeley pond — four miles from Elliotts's — lunch was taken. The attractions ahead were very tempting, but for lack of time it was decided not to push on farther. On the return eight of the party crossed the Scaur Bridge and climbed the steep acclivities beyond as far as the path to the "Kettles." It being too late, however, to ascend the Scaur itself they proceeded by way of the "Kettles" — great circular depressions of very regular formation, and beautiful with the foliage of beeches and maples — toward home amid the fast gathering darkness of the woods.

The party returned to Boston on Saturday, October 17. Another week could have been well spent in walks to Towle's Falls, the Scaur, the Slides, Avalanche Brook, the Divide, and other interesting points about Waterville.

The coloring of the foliage was very brilliant, and added much to the natural beauty of the hillsides and the woods.

Besides the Excursions, there have been six all-day walks, viz.: on Washington's Birthday, Patriots' Day, the May Walk, Decoration Day, Labor Day, and Election Day.

The walk on the 22d February was conducted by Mr. Field, and was taken partly on snow-shoes. The party numbered twenty, and walked about eight miles from Hyde Park over Fairmount to the Blue Hill Reservation, returning to Boston via Readville.

On the 19th of April Messrs. J. R. Carret, J. A. Crosby, and G. D. Newcomb led a party of one hundred and ten to Rafe's Chasm, and through the woods of Magnolia and West Gloucester. The day was fine and the walk was much enjoyed.

The May Walk occurred on the 2d of the month and was to Monk's Hill in Kingston, under the direction of Messrs. Carret and Crosby. It was attended by thirty-nine persons.

On May 30 — Decoration Day — Mr. Newcomb conducted a party of twenty to Eliot's Oak and Pegan Hill in Dover, returning, after lunch on the banks of Charles River, by way of the Indian Ridge and Wellesley.

On Labor Day, September 7, Messrs. Field and Newcomb led a party of thirty-four to Echo Bridge and Hemlock Gorge at Newton Upper Falls, thence proceeding over the Sudbury River Aqueduct to Wellesley.

November 3, the day of the National Election, thirty-five persons, under the lead of Mr. A. R. Bailey, took the walk to the ancient wolf-pits, built in 1635, in Lynn Woods, thence to Robin's Rock, and the Serpentine Mound in Lynnfield, returning by way of the Phaeton Rock and Wildcat Ledge.

During the year forty Saturday Outings have been planned, of which several have been taken on snow-shoes. Ten have been given up on account of bad weather.

Places visited this year have been Blue Hill in Milton, Doublet Hill in Weston, Pine Hill in Medford, Legg's Hill and "the Dungeons" in Marblehead, Pegan Hill in Dover, Indian Ridge in Wellesley, Tidd's Hill, Granny Hill, and Mt. Independence in Lexington, Turkey Hill in Arlington, Prospect Hill in Waltham, Monk's Hill in Kingston, Horn Pond Mt. in Woburn, Mystic Ponds in Winchester, Middlesex Fells, Lynn Woods, Robin's Rock in Lynnfield, Little Nahant, Squantum Head, Swallow's Cave in Nahant, Charles River Village, Melrose Kennels, Waban Hill in Newton, Crescent Beach, Franklin Park, Stony Brook, Pranker's Pond, Gloucester (by steamer), and Cat Rock Ridge in Weston.

The following have volunteered as leaders: Miss Caroline H. Fabens, Messrs. A. R. Bailey, J. R. Carret, W. L. Chaloner, E. G. Chamberlain, J. A. Crosby, Thos. Crozier, W. R. Davis, S. P. Dodge, P. B. Field, E. D. Greenleaf, C. C. Hall, E. W. Howe, R. B. Lawrence, A. S. Lynde, G. H. Morgan, F. N. Mudge, G. D. Newcomb, J. B. Osborn, J. A. Palmer, A. S. Parsons, and J. Ritchie, Jr.

The Committee has to report that their Treasurer has on hand at the close of the year railroad tickets of the value of $72.89, and in cash $19, after paying $50 to the Treasurer of the Club.

They have been unable to estimate exactly the amount of health and pleasure gained by the participants in these various excursions, walks, and outings, but are of opinion that the sum total, if it could be accurately determined, would show a large balance to the credit of the account.

CHARLES C. HALL,
JAMES R. CARRET,
HARVEY N. SHEPARD,
ALVIN R. BAILEY,
JULIUS A. PALMER,
PARKER B. FIELD,
GEORGE D. NEWCOMB,

Committee on Field Meetings and Excursions.

BOSTON, December 31, 1896.

Proceedings of the Club.

November 11, 1896. — One Hundred and Sixty-eighth Corporate Meeting.

President Parsons in the chair.

One hundred and fifteen persons were present. The records of the last meeting were read and approved. Seven candidates for membership were elected.

The President announced the resignation of the Councillor of Art, Miss Rose Hollingsworth. It was voted to defer filling the vacancy until the annual meeting.

The reports of the Councillors of Natural History and Topography were presented (see pp. 269 and 270).

Professor Alfred E. Burton and Assistant Professor George H. Barton, of the Massachusetts Institute of Technology, addressed the club on "A Summer in Umanak, Greenland." A large number of lantern views were shown, illustrating the route, mountains, glaciers, icebergs, and the Esquimaux. The party went north with Lieutenant Peary, and were left for six weeks at Umanak for scientific observation and study. Professor Burton gave an account of the party and the trip, and described the scenery and inhabitants. Mr. Burton spoke particularly concerning the glaciers and their phenomena.

December 9, 1896. — Special Meeting.

President Parsons in the chair.

Eighty persons were present.

Mr. Edwin Swift Balch, of Philadelphia, presented an illustrated paper entitled, "Ice Caves and the Causes of Subterranean Ice" (see p. 201). After a few words about ice gorges and wind caves, he described many of the ice caves which he had visited in Hungary, France, Germany, and Switzerland, and quoted from numerous writers to show the theories advanced to explain the formation of the ice. He thought that the cold weather of winter was the real cause, and showed how different conditions produce varying phenomena. Twenty-four interesting lantern illustrations were shown. Mr. J. Ritchie, Jr., spoke in an appreciative manner of the paper and of the writer's careful research and very wide observation.

December 16, 1896. — One Hundred and Sixty-ninth Corporate Meeting.

President Parsons in the chair.

Forty-five persons were present, in spite of a severe gale and drifting snow. The records of the last regular and special meetings were read and approved. Fifteen candidates for membership were elected.

The President appointed as a Committee to audit the accounts of the

Treasurer and Trustees, Messrs. George O. Davis, George O. Smith, and Rufus A. Bullock, and as a Committee on Annual Reception, Mr. J. Ritchie, Jr., Miss Mabel C. Chester, Miss M. A. Knowles, Miss Annie E. Allen, and Mr. William S. Rumrill.

The report of the Councillor of Exploration with Appendices was read by the Recording Secretary (see p. 275).

The President then read a letter from Mr. Edwin H. Abbot expressing his appreciation of the thoughtful care bestowed upon the remains of his son after the accident on Mount Lefroy. It was voted that the letter be published as an appendix to the report of the Councillor of Exploration.

Mr. Frederic Endicott presented his report as Councillor of Improvements (see p. 280).

Professor G. Frederick Wright addressed the Club concerning his trip to Greenland in 1894 on the ill-fated "Miranda." His account was illustrated with numerous stereopticon views showing the scenery of Southern Greenland, the Esquimaux, the ice-floes and icebergs. A careful estimate of one of the bergs placed its height at 750 feet. The two accidents to the iron steamship were described, and the safe return upon a little Gloucester schooner.

January 13, 1897. — One Hundred and Seventieth Corporate (Annual) Meeting. 7.45 P. M.

President Parsons in the chair.

One hundred persons were present. The records of the last meeting were read and approved. Five candidates for honorary and four for corresponding membership were elected, as follows: —

TO HONORARY MEMBERSHIP.

WILLIAM MARTIN CONWAY	London, Eng.
GARDINER G. HUBBARD	Washington, D. C.
JOSEPH LECONTE	Berkeley, Cal.
VITTORIO SELLA	Biella, Italy.
EDWARD WHYMPER	London, Eng.

TO CORRESPONDING MEMBERSHIP.

E. DEVILLE	Ottawa.
J. J. MCARTHUR	Ottawa.
HARRY FIELDING REID	Baltimore.
WARREN UPHAM	St. Paul.

Fourteen candidates were elected to corporate membership.

The President called attention to the notices upon the Club circular, especially that concerning the proposed exhibition in the Club rooms, on January 25, of the new high mountain photographs presented by Vittorio Sella, together with a collection of water colors of Greenland scenery, and some water colors of Waterville scenery by Mr. W. L. Chaloner.

The annual reports of the Recording and Corresponding Secretaries, Treasurer, Trustees of the Permanent and Reserve Funds, and Auditors were presented. (For the several reports see APPALACHIA, pages 254 to 266).

The Trustees of Real Estate reported that several matters had been under consideration during the year, but that until something definite was accomplished it did not seem wise to submit a written report.

Reports of the Room Committee, the Excursion Committee, and the Committee on the Sella Collection were presented. (See APPALACHIA, pages 281, 284, and 273.)

The Committee on the Nomination of Officers for 1897 made the following report: —

For President, Harvey N. Shepard; for Vice-President, Richard B. Grover; for Recording Secretary, Rosewell B. Lawrence; for Corresponding Secretary, John Ritchie, Jr.; for Treasurer, John E. Alden; for Councillor of Natural History, George L. Chandler; for Councillor of Topography, Louis F. Cutter; for Councillor of Art, Helen E. Endicott; for Councillor of Exploration, Parker B. Field; for Councillor of Improvements, Frederic Endicott; for Trustee of the Permanent and Reserve Funds (for three years), Isaac Y. Chubbuck; for Trustee of Real Estate (for four years), J. Rayner Edmands.

The balloting for officers resulted in the unanimous election of all the candidates nominated. President Parsons appointed ex-President Fay a Committee to escort the President-elect to the chair, and with appropriate remarks President Shepard assumed the duties of the office.

Mr. Leon S. Griswold then gave an account of an ascent of Mount Powell, in western Montana. A trail was followed on horseback until the higher portion of the mountain was reached. A description was given of the near view, the distance being obscured by smoke, and information was given concerning the geology and the ruthless cutting of wood for the smelters.

The Recording Secretary read a paper prepared by Professor J. W. Toumey of the University of Arizona, entitled, "La Ventana, Santa Catalina Mountains" (see p. 225). The account of this one day's exploring trip from Tucson was replete with botanical information, and was illustrated by two photographs of "the window" in the mountain wall.

January 21, 1897. — Special Meeting.

President Shepard in the chair.

About one hundred persons were present.

Mr. William C. Bates presented a paper entitled, "Mushrooms, edible and poisonous." Seventy lantern illustrations were shown. The speaker illustrated the edible and poisonous varieties, and showed how to distinguish them. He also dwelt upon the economic food value of mushrooms, and urged the more extended use of fungi as food by all classes.

February 10, 1897. — One Hundred and Seventy-first Corporate Meeting.

President Shepard in the chair.

Eighty-five persons were present. The records of the last regular meeting were read and approved. Six candidates for corporate membership were elected. The President called attention to the Annual Reception to be held at the Hotel Vendome, February 12, and to the Winter Excursion to Woodstock, Vt., February 20 to March 1. The Chairman of the Room Committee spoke of the large number of visitors at the Club room during the exhibition from January 25 to 30.

The following action was taken by the Club: —

" *Voted*, That the Appalachian Mountain Club gratefully recognizes the generosity of Miss Anne Whitney in conveying to it twelve acres of land upon the right bank of the Androscoggin River, in the town of Shelburne, New Hampshire. This is situated near the Lead Mine Bridge, and has been acquired for the purpose of preserving unimpaired the natural beauties of the river banks, and of freeing the noble view of the White Mountains from unsightly surroundings. The Club returns hereby to Miss Whitney its sincere thanks for her kindness."

Professor William H. Niles addressed the meeting upon the following subject: —

"The Evolution of the Great Lakes and St. Lawrence Waterway." This communication was apt at the present time, as commercial men are interested in a project for a deep waterway between the Great Lakes and the Atlantic seaboard. A Commission which has just reported to Congress has decided that the geographic questions involved are of the first importance, and the speaker treated these questions. The early form of the continent, the subsequent elevations, the influence of the glaciers, and the various drainage problems were discussed in relation to the subject.

March 10, 1897. — One Hundred and Seventy-second Corporate Meeting.

Vice-President Grover in the chair.

One hundred eighty-five persons were present. The records of the last meeting were read and approved. Fifteen candidates for corporate membership were elected. The chairman announced that the Field Meeting would be at the Profile House early in July.

Mr. J. G. Thorp, of the Old Cambridge Photographic Club, gave an illustrated lecture on "The Charles River from source to mouth." This lecture is a joint production of Mr. Thorp and the Club, prepared for the purpose of stimulating an active interest in plans for improving the river. A large number of beautiful views were thrown upon the screen, and many interesting historical incidents related by the speaker. The Metropolitan Reservation at Hemlock Gorge not only illustrated the scenic attractions of the river, but offered an excellent illustration of how they can be preserved and improved.

March 24, 1897. — Special Meeting.

President Shepard in the chair.

Ninety persons were present. The President announced the failure in the Massachusetts Senate of a bill providing for a report on the forest areas of this State, and the passage by the New Hampshire Legislature of a bill providing for a report on a possible forestry reservation in that State.

On motion of Mr. John Ritchie, Jr., the Corresponding Secretary, the following protest to a paragraph in the Dingley bill in Congress was unanimously adopted: —

"One of the provisions of the Dingley bill now before Congress seeks to lay a duty on the books and apparatus imported into this country by Public Libraries, Educational Institutions, and Learned Societies, for their own use and not for sale.

"Such a duty is in direct opposition to the principles fostering education which have been characteristic of the government of this country. It places obstacles in the path of those institutions whose efforts are devoted to the enlightenment of our citizens, whose libraries are freely opened to students and to the people, and whose aim is not pecuniary advantage, but the bettering of our countrymen. It lays a burden on those institutions whose work is already large in proportion to their means, and must effect a curtailment of activity in all instances and its cessation in others. It is a step backwards in the history of a country whose motto has been 'Progress,' and whose pride it has been to point to the education afforded to its citizens by its public institutions.

"The Appalachian Mountain Club, therefore, desires to enter a most emphatic protest against that portion of the bill which affects the importation of books and instruments by Libraries, Societies, and Educational Institutions."

Dr. Lyman B. Sperry, of Oberlin, Ohio, addressed the Club, and exhibited a new set of lantern views of the Lake Macdonald region. Exploration last summer yielded new information and many views of the grand and beautiful scenery of Lake Macdonald, Avalanche Basin, the glaciers and the numerous peaks of the region. The speaker closed with descriptions of Mts. Rainier and Hood, finely illustrated with views.

April 14, 1897. — One Hundred and Seventy-third Corporate Meeting.

President Shepard in the chair.

Ninety persons were present. Fifteen candidates for membership were elected.

The President had appointed as a Committee to recommend action upon the death of Charles Eliot, Mr. George C. Mann, Professor Charles E. Fay, Mr. Philip A. Chase, and Professor Frederic D. Allen. In behalf of the Committee, Mr. Mann made extended remarks upon the character and work of Mr. Eliot, and presented the following resolutions: —

Resolved, That in the death of Charles Eliot the Appalachian Mountain Club loses a valued member, through whose skill and disinterested labors as its Councillor of Topography the Club was enabled to increase its field of usefulness, and through whose clear prevision and stimulating energy it was led to take the initiative in the movement that has resulted in the permanent dedication to the public of beautiful and historic places, and the establishment of a noble system of public parks in the vicinity of Boston.

Resolved, That this Club, profoundly appreciating the high quality of Charles Eliot's character and work, desires that a suitable account of the origin of the movement for the creation of the Trustees of Public Reservations and of the Metropolitan Park Commission, be published in APPALACHIA. (See p. 244.)

Resolved, That we heartily indorse the suggestion that some visible memorial of Mr. Eliot's genius and devotion be erected in some part of the Metropolitan Park system.

The resolutions were passed unanimously by a rising vote.

Several short papers were presented describing the various trips taken during the recent Snow-shoe meet at Woodstock, Vt. Mr. W. R. Davis gave an outline of the whole excursion. A series of papers was then presented, as follows: "Quechee Gulf," written by Mr. and Mrs. Parker B. Field, read by Mr. Field; "Mount Tom," by the Misses Endicott, read by Miss Charlotte M. Endicott; "Winter Camps," by Mr. C. M. Cox; "Luce's Lookout and Lakota Park," by Miss M. A. Furbish; "Mount Ascutney," by Mr. Louis E. K. Robson; and "Killington Peak," by Mrs. W. R. Davis.

May 11, 1897. — One Hundred and Seventy-fourth Corporate Meeting.

President Shepard in the chair.

One hundred and ten persons were present. Eighteen candidates for membership were elected.

Mr. Ritchie gave notice that the Room Committee would be at home at the Club rooms on Monday, May 17, from two till nine o'clock, and that during the week there would be an exhibition of mountain pictures, views of the Rocky mountains and of the Muir Glacier, and photographs of the mountains of the moon.

Rev. Roland D. Grant, D. D., of Concord, N. H., one of the founders of "The Mazamas," Portland, Oregon, gave an illustrated lecture entitled, "Mount Hood, her waterfalls and surroundings; with a study of Crater Lake."

The history of Oregon and the Columbia River and the topography of the region were briefly outlined, and then an account, well illustrated, was given of the ascent of Mount Hood by a large party of men and women and the founding of "The Mazamas" on its summit. Beautiful waterfalls, curious rock formations, fine snow fields and glaciers, the interesting Columbia River, and the wonderful Crater Lake were profusely illustrated.

June 9, 1897. — One Hundred and Seventy-fifth Corporate Meeting.

President Shepard in the chair.

Seventy persons were present. Sixteen candidates for membership were elected.

Professor W. H. Niles, in behalf of the Boston Society of Natural History, invited the Club to join in an invitation to the American Association for the Advancement of Science to hold its Jubilee meeting in 1898 in Boston. It was voted to accept the invitation and to authorize the Council to act for the Club.

A paper by Mr. A. E. Douglass, of Arizona, describing an ascent of Popocatepetl (see p. 221) and illustrated by photographs, was read. A few lantern views of the mountain and crater, belonging to the Club, were shown.

A paper by Mr. Charles Sloan Reid, of Walhalla, N. C., describing an ascent of Mount Mitchell, was read. (See p. 232.)

Mr. R. B. Lawrence spoke with reference to the Club camping party in August at Randolph, N. H., and showed lantern views illustrating the scenery of the region and especially the Club hut at Madison Spring. Most of the views were taken by Mr. Parker B. Field, the remainder by Messrs. Endicott and Lawrence.

Officers for 1897.

President.

HARVEY N. SHEPARD, 53 State Street, Room 1049, Boston.

Vice-President.

RICHARD B. GROVER, 67 Ashland Street, Roslindale.

Recording Secretary.

ROSEWELL B. LAWRENCE, Tremont Building, Room 745, Boston.

Corresponding Secretary.

JOHN RITCHIE, JR., Box 2725, Boston.

Treasurer.

JOHN E. ALDEN, Tremont Building, Room 1049, Boston.

Councillors.

Natural History, George L. Chandler, Auburndale.
Topography, Louis F. Cutter, Winchester.
Art, Helen E. Endicott, Canton.
Exploration, Parker B. Field, Milton.
Improvements, Frederic Endicott, Canton.

Trustees of Permanent and Reserve Funds.

I. Y. Chubbuck.
Charles H. French.
Rest F. Curtis.

Trustees of Real Estate.

J. Rayner Edmands.
Augustus E. Scott.
Charles E. Fay.
Harvey N. Shepard.
Parker B. Field, *Ex officio.*

Members added since June, 1896.

HONORARY MEMBERS.

Conway, Wm. Martin, London, Eng.
Hubbard, Gardiner G., Washington, D. C.
LeConte, Joseph, Berkeley, Cal.
Sella, Vittorio, Biella, Italy.
Whymper, Edward, London, Eng.

CORRESPONDING MEMBERS.

Deville, E., Ottawa, Canada.
McArthur, J. J., Ottawa, Canada.
Reid, Harry Fielding, Baltimore, Md.
Upham, Warren, St. Paul, Minn.

CORPORATE MEMBERS.

Adams, Miss Mabel Ellery, Quincy.
Alden, Edmund K., Brooklyn, N. Y.
Allen, William G., Brockton.
Anderson, Miss Mary P., Somerville.
Ayer, John F., Somerville.
Bacon, Edwin M., Boston.
Bancroft, Chas. P., Concord, N. H.
Bancroft, Mrs. Chas. P., Concord, N. H.
Baston, Frederick O., Natick.
Beaman, George W., Cambridge.
Bothfeld, Henry E., Newton.
Brown, Lawrence E., Lynn.
Brown, Percy Emerson, Cambridge.
Bryant, Miss Virginia, Boston.
Buckingham, Miss Eliza W., Cambridge.
Came, Mrs. Fred L., Brookline.
Carter, J. Franklin, Fall River.
Chaloner, Mrs. W. L., Boston.
Chester, Walstein R., Brookline.
Chester, Mrs. Walstein R., Brookline.

Crocker, W. T., East Boston.
Dallinger, Frederick W., Cambridgeport.
Driver, Miss Emma McC., Beverly.
Eliot, Miss Alice R., Cambridge.
Elwell, Newton W., Boston.
Ewings, Miss Mabel W., Lowell.
Farnham, Frank A., Boston.
Fox, Mrs. Jabez, Cambridge.
Francis, Mrs. Harry C., Philadelphia.
Grigg, Frederic W., Newtonville.
Hallett, Miss J. I., Cambridge.
Harris, Henry S., Boston.
Harris, Mrs. Henry S., Boston.
Hascall, L. C., Boston.
Haskell, Alfred T., Dorchester.
Hayes, Miss Grace L., Peabody.
Hinckley, Miss E. D., West Newton.
Humphrey, John T., Boston.
Ide, Mrs. Bertha S., Boston.
Ireland, George H., Springfield.
Ireland, Mrs. Geo. H., Springfield.
Jenney, Charles F., Boston.
Jenks, Paul R., Plymouth, N. H.
Keene, Jarvis B., Watertown.
Kelsey, Harlan P., Kawana, N. C.
Kendall, Miss Elizabeth, Boston.
Kincaide, Miss Martha C., Quincy.
Leighton, Mrs. George E., Roxbury.
Lindsey, Mrs. N. A., Marblehead.
Lord, Mrs. Charles E., Newton.
Loring, Miss Edith M., Milton.
Loring, Mrs. Elisha T., Milton.
Mackintosh, Mrs. R. B., Peabody.
Maffitt, Harry S., Boston.
Marsh, Edward, Dedham.
Marshall, Miss Annie M., Cambridge.
McAllister, Elliott, San Francisco, Cal.
Merriam, Arthur M., Boston.
Merrill, Miss Emma L., Roxbury.
Michael, Arthur, Boston.
Miner, Henry B., Hyde Park.
Moore, George F., Andover.
Muirhead, James F., Boston.
Nichols, John L., Somerville.
Nichols, Mrs. John L., Somerville.
Olmstead, Frederick L., Jr., Brookline.
Paine, Mrs. John K., Cambridge.
Peabody, Joseph W., Wellesley Hills.
Peck, Miss Annie S., Providence, R. I.
Penfield, Miss Annie S., Boston.
Perkins, Mrs. S. M., Lynn.
Reed, M. Webb, Boston.
Ring, Miss Rebecca L., Providence, R. I.
Rogers, Thomas O., Boston.
Rogers, Mrs. Thomas O., Boston.
Rowell, Frank B., Lynn.
Shaw, Robert K., Worcester.
Skillings, Mrs. Wm. E., Roxbury.
Small, Francis J., Roxbury.
Smith, Miss Anne E., Roxbury.
Spinney, Wm. A., Newton Centre.
Stephens, C. A., Norway Lake, Me.
Taylor, George, Brookline.
Taylor, W. B., Brookline.
Teel, Mrs. Harriet E., Nahant.
Thallon, Miss Florence N., Sebago, Me.
Tilden, Charles J., Milton.
Tinkham, Mrs. Louisa W., Roxbury.
Tinkham, Samuel E., Boston.
Tillinghast, Linwood M., Boston.
Torrey, Charles C., Andover.
Twitchell, Edward T., Dorchester.
Vinal, Arthur P., Somerville.
Wade, John F., Boston.
Ware, Mrs. Adela B., Auburndale.
Watters, W. F., Somerville.
Whitman, Edmund A., Cambridge.
Whitman, James H., Charlestown.
Wilder, Miss Frances A., Somerville.
Wilson, Mrs. Caroline F., Brookline.
Woods, J. Henry, Brookline.
Wright, Merle St. C., New York.
Young, Charles S., Newton Centre.
Young, Mrs. Charles S., Newton Centre.
Ziegler, A., Roxbury.
Ziegler, Miss Clara M., Roxbury.
Zirngiebel, Miss Frances, Roxbury.

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The Alpine Orthoptera of North America.

BY SAMUEL H. SCUDDER.

IN the year 1877, when I made my first collecting trip in the western United States, I climbed Sierra Blanca, Pike's Peak, and Mt. Lincoln in Colorado, for the express purpose of collecting the insects found above the forest line; and although but a few hours at the most were secured at either of these points, and of course a briefer time on the extreme summits themselves, the material obtained was sufficient to extend considerably our meagre knowledge of alpine insects. In the White Mountains of New Hampshire, almost the only elevations in the United States east of the Mississippi which rise above the forest line, I had long and repeatedly collected, as had many others.

The last of the new Orthoptera obtained by me have only very recently been published. I have therefore thought that a summary of what can be said of the character and distribution of alpine Orthoptera in North America would interest at least some of the readers of APPALACHIA. I am indebted especially to Prof. L. Bruner, Mr. A. P. Morse, and Mrs. A. T. Slosson for additions to the list.

The list of species given below includes not only those characteristic of the fauna of the highest elevations, but also mentions all such as have been taken at or above the forest line, and may be considered as at least partially domiciled there.[1] Naturally the number of these last must be relatively much greater in the list for the White Mountains than in that for the Rockies, since the former have been explored with considerable care, while only flighty visits have been made to the greater altitudes of the Western mountains.

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[1] I have omitted the cockroach, *Periplaneta americana*, taken by Mrs. Slosson in the house on the summit of Mt. Washington; and also the two undetermined species of Trimerotropis from the Pacific coast. These appear in the subsequent catalogue.

For the sake of readier comparison, I give on pages 302–303 in parallel columns separate lists, systematically arranged, of the known alpine orthopteran fauna of (1) the European Alps, (2) the White Mountains of New Hampshire, (3) the Rocky Mountains, and (4) other Western localities, principally on the Pacific slope. The European list is made up from such statements as can be gleaned from the writings of Fischer, Meyer-Dür, Brunner, Krauss, and Bolivar, and may not be strictly accurate or complete. In the genus Podisma I have profited by some material kindly sent me by Hofrath Brunner von Wattenwyl.

So far as I am aware, no special paper on the alpine Orthoptera of Europe has ever been published, but in Fischer's work on European Orthoptera,[1] a brief paragraph (pp. 54, 55) in the introduction treats of the Orthoptera of the "subalpine region," and a list of twelve species is given; and Meyer-Dür in his paper, "Ein Blick über die schweizerische Orthopternfauna,"[2] pays special attention to the elevation at which the Swiss Orthoptera occur. In our own country there is no special literature to refer to, except the bare lists of names of species of all orders found on the summit of Mt. Washington, N. H., by Mrs. Annie Trumbull Slosson, published in successive brief papers in the Entomological News of Philadelphia within the last few years; and my paper on the "Distribution of Insects in New Hampshire," published in C. H. Hitchcock's Report[3] on the geology of the state more than twenty years ago.

As appears at once from the list on pages 302–303, the alpine species belong principally to the two saltatorial families, Acridiidæ and Locustidæ, and almost entirely to the former, while the third saltatorial family, Gryllidæ, is altogether absent, as are the relatively tropical families, Phasmidæ and Mantidæ. In only one instance, *Melanoplus extremus*, is any species repeated in two of the columns, showing the specific independence of each region; while the genera are not uncommonly repeated, especially Podisma and Melanoplus, the two groups most abundant in alpine species.

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[1] L. H. Fischer: Orthoptera Europæa. Leipzig, 1853. 4°.

[2] Denkschr. schweiz. naturf. Gesellsch., xvii., 1860, 52 pp. 4°.

[3] Vol. I., chap. 12, pp. 331–384, pl. A–C. 1874.

There is a great deal of difference between these species as to their relative alpinity, as it might be called, many merely overflowing, as it were, from below over a part or a whole of the overlying alpine district, and so I have marked what seem to me should be regarded as the alpine species *par excellence* by adding an exclamation point after their names; probably more of the European list, especially in the genus Podisma, should be so designated. This greatly restricts the list, and, with the exception of *Anabrus coloradus*, confines it entirely to the Acridiidæ, and largely to the genera Podisma, Melanoplus, and Gomphocerus, a fact which points out these genera, and especially the first, as more characteristically alpine. The genus Melanoplus, however, is so rich in species at lower levels, over one hundred and thirty in all being known, that its weight is elsewhere; while the genus Paradichroplus is known only through a single species which is a veritable alpinist. *Melanoplus extremus* is included in the restricted list (27 species) only because, as will appear later, its alpine representatives are distinguished as a variety.

In this list the European species number 24 (11 !), the White Mountain list, excluding the Labrador species, 18 (2 !), the Rocky Mountain list, 22 (11 !), and the Pacific coast list, 6 (3 !). The proportion between the first and the third is close, and in direct relation to the extent of area covered by the two, while the slender White Mountain area, with its few square miles and its lesser elevation above the forest line, makes a brave showing beside them; better, doubtless, than would be the case were the alpine elevations of the West as well searched as those of the East have been.

As a rule, the strictly alpine species are apterous or subapterous, or at least have more or less abbreviated wings, when compared with their allies; one striking exception is noted below.

LIST OF EUROPEAN AND AMERICAN ALPINE ORTHOPTERA.

European Alps.	**White Mountains.**	**Rocky Mountains.**	**Other Western localities.**
FORFICULIDÆ.			
Forficula auricularia			
Anechura bipunctata			
Chelidura aptera			
BLATTIDÆ.			
Ectobia lapponica			
ACRIDIIDÆ.			
Tettiginæ.			
Tettix bipunctatus	**Tettix granulatus**	**Tettix sp.**	
	Tettix ornatus		
	Tettigidea parvipennis		
Tryxalinæ.			
Stenobothrus viridulus !	**Stenobothrus curtipennis**	**Stenobothrus sp.**	
Stenobothrus lineatus !			
Gomphocerus sibiricus !		**Gomphocerus carpenterii !**	**Bruneria shastana ! (Mt. Shasta)**
Gomphocerus brevipennis !			
Stetheophyma fuscum	**Mecostethus gracilis**		
Œdipodinæ.			
	Chortophaga viridifasciata		
	Camnula pellucida		
	Hippiscus tuberculatus	**Hippiscus altivolus !**	
Bryodema tuberculata		**Circotettix undulatus**	**Circotettix maculatus (Sierra Nevadas)**
	Circotettix verruculatus		**Circotettix suffusus (Mt. Shasta)**
Acridiinæ.			
			Paradichroplus mexicanus ! (Orizaba)
		Bradynotes referta	**Bradynotes obesa (Mt. Shasta)**

LIST OF ALPINE ORTHOPTERA, *continued*.

European Alps.	White Mountains.	Rocky Mountains.	Other Western localities.
ACRIDIIDÆ.			
Acridiinæ (cont.).			
Podisma pedemontana		Podisma nubicola!	
Podisma cobellii!		Podisma stupefacta!	
Podisma costæ!		Podisma dodgei!	
Podisma parnassica!		Podisma marshallii	
Podisma pyrenæa!		Podisma oregonensis	
Podisma salamandra			
Podisma baldensis	Podisma glacialis!		
Podisma pedestris!			
Podisma alpina!			
Podisma frigida!			
	Melanoplus atlanis	Melanoplus spretus	
	Melanoplus [1] borealis!	Melanoplus excelsus!	
	Melanoplus femur rubrum	Melanoplus gillettei!	
		Melanoplus militaris	
		Melanoplus altitudinum!	Melanoplus ascensus! (Mt. Shasta)
	Melanoplus extremus!	Melanoplus extremus!	
	Melanoplus femoratus	Melanoplus monticola!	
		Melanoplus alpinus	
LOCUSTIDÆ.			
Phaneropterinæ.			
Pœcilium fieberi	Scudderia pistillata		
Isophya kraussi			
Conocephalinæ.			
	Conocephalus ensiger		
	Orchelimum vulgare		
Decticinæ.			
Platystolus ustulatus		Anabrus coloradus!	
Stenopelmatinæ.			
	Ceuthophilus terrestris	Ceuthophilus valgus	
		Ceuthophilus alpinus	

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[1] Placed here by courtesy, as it were, to bring it into the list. It comes from Labrador.

The distribution, both within and without the alpine district, of all the North American Orthoptera known to me to occur above the forest line is given in what follows.

1. **Periplaneta americana** (Linné). This cockroach appears in Mrs. Slosson's list of White Mountain insects (Entom. News, Vol. V., p. 6), but she informs me that only one specimen was seen, and that in the lower hall of the Summit House on Mt. Washington, so that it was undoubtedly introduced with food or otherwise; "evidently a summer boarder," says Mrs. Slosson.

2. **Tettix granulatus** (Kirby). This little grouse locust has been several times taken close to the summit of Mt. Washington. It is one of our commonest species of Tettix. First described as from "lat. 56°" by Kirby (probably the Athabasca region), it has since been found all over the northern part of the continent, from Arctic America to Vancouver Island, Colorado, Kansas, Indiana, and New Jersey; in New England it occurs everywhere. It is figured in the First Report of the U. S. Entom. Comm., p. 256.

3. **Tettix sp.** A species of Tettix, closely allied to the last but apparently undescribed, was obtained by Prof. L. Bruner, at Tennessee Pass, Colorado, at an elevation of about 10,500 feet. I have not seen it from any other place.

4. **Tettix ornatus** (Say). This has been found on the summit of Mt. Washington, but is rather less common there than *T. granulatus*. Mrs. Slosson was the first to record it from this elevation. Its range in New England is the same as that of *T. granulatus*, but it is a more southern form, extending from the settled parts of Canada, east of the Great Plains, to Carolina, Kentucky, and Texas. It is excellently figured in Say's Entomology of N. A., Vol. I., pl. 5.

5. **Tettigidea parvipennis** (Harris). Again found on the summit of Mt. Washington and distributed all over New England. I use here, without verifying it, the terminology of Morse, who separates the northern and southern forms heretofore classed under *lateralis*. It is figured in Harris's Treatise on injurious insects, 3d ed., p. 137.

6. **Stenobothrus curtipennis** (Harris). This very common insect, which is spread everywhere over the country east

of the Rocky Mountains, and north of the Ohio, occurs not uncommonly in the alpine district of the White Mountains, but is not in any sense to be regarded as an alpine grasshopper. In this respect it resembles its European congener, *S. viridulus* (Linn.), which occurs over the whole of northern and middle Europe, and extends its range to the highest Alps, wherever there are meadows. Bruner took our species or an allied one (*S. coloradus*) about the forest line on the north slope of Soldier Mountain, Idaho. A good figure of our species will be found in Harris's Treatise on injurious insects, 3d ed., pl. 3, fig. 1.

7. **Gomphocerus carpenterii** Thomas. Pl. XLI., figs. 1, 2. This is a very common little grasshopper in the alpine region of Colorado. I have myself taken it on all the high mountains I ascended, — on Sierra Blanca, between 11,000 and 13,000 feet, on Mt. Lincoln within the same limits, and on Pike's Peak, between 12,000 and 13,000 feet. Mr. C. F. Baker has sent me specimens from Cameron's Pass, 11,800 feet, Clark's Peak in northern Colorado, 11,700 feet, as well as from the mouth of the Big South in Larimer County, 8000 feet. I have also taken it at lower levels in Colorado, as below the forest line on Sierra Blanca, at Garland, 8000 feet, about Georgetown, 7500 to 8500 feet, and at various points in the South Park, 8000 to 10,000 feet, as well as at Evanston, Wyo., 6800 feet, and at Rock Creek, Wyo. Bruner tells me he took it near timber line on Soldier Mountain, Idaho; it was originally described from the Mountain of the Holy Cross, Colorado, 8000 to 10,000 feet, and Cockerell reports it from Brush Creek, Colo., about 12,000 feet. [It is possible that the earlier described *Gomph. clavatus* Thom. is the same as this, in which case the name should be changed, and the range extended to Kansas and Nebraska.] It is far more abundant at the highest than at the lower elevations, and may be regarded as a characteristic alpine insect. Its feeble little song adds to its attraction; the note sounds like *tch* repeated with exceeding rapidity, while the legs move rapidly over a short arc; the repetition is so rapid as to seem like a single note, which lasts from one to two and a half seconds; it is always fainter at the start and strongest just before the end. The insect is figured in the Reports of the Wheeler Survey, Vol. V., pl. 44, fig. 5.

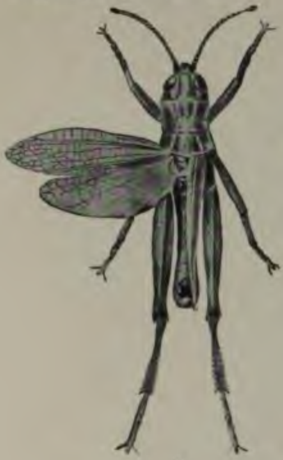
8. **Bruneria shastana** (Scudder). The only locality known for this subapterous insect is high up on the slopes of Mt. Shasta, California, "among the firs," so that it should not properly come in our list, were it not highly probable that it will be found on the same mountain above the forest line. It was discovered by Dr. A. S. Packard.

Since this was written I learn that it was taken by Mr. A. P. Morse early last September on the same mountain on the "pumice stone plateau" (see *Bradynotes obesa*, No. 21), a little below timber line. He found it common, but less so than *Bradynotes obesa;* "active, the males shy and difficult to catch, making long leaps." An enlarged figure is given in Proceedings Davenp. Acad. Sc., Vol. VI., pl. 5, fig. 26; one of natural size may be found in the Second Report U. S. Entom. Comm., pl. 17, fig. 15.

9. **Mecostethus gracilis** (Scudder). This insect is found along the border line of the United States and Canada from the Atlantic nearly to the Rocky Mountains, and in elevated spots somewhat further south, as in the Black Hills of South Dakota. In New England it occurs in the northern states only, but is found abundantly on the summit of Greylock, 3500 feet, in Massachusetts. It is very common in the White Mountains, and not uncommon on the summit of Mt. Washington about Semidea Plateau. It is one of our stridulating insects, and noisy enough to be heard fifty feet away, so as more readily to be found wherever it occurs, which is an advantage to the collector, as it is a shy insect. It usually makes four notes, the first followed by a slight pause.

As an alpine grasshopper, it may be said to be represented in Europe by the allied stridulating *Stetheophyma fuscum* (Pall.), which in the Alps extends upward to about 4500 feet, or into the lower portion of the subalpine zone. The single European species of the genus Mecostethus does not extend so high up in the Alps, though according to Meyer-Dür it has been found to about 4000 feet, or barely within the subalpine zone.

10. **Chortophaga viridifasciata** (DeGeer). One of our most common and widely spread insects, its range extending from Canada southward to the Gulf of Mexico, even to Key West in the east, and in the west to Guatemala. In the White



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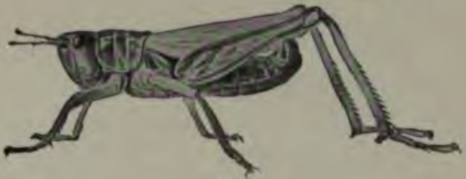

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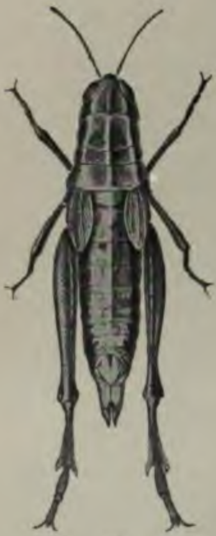

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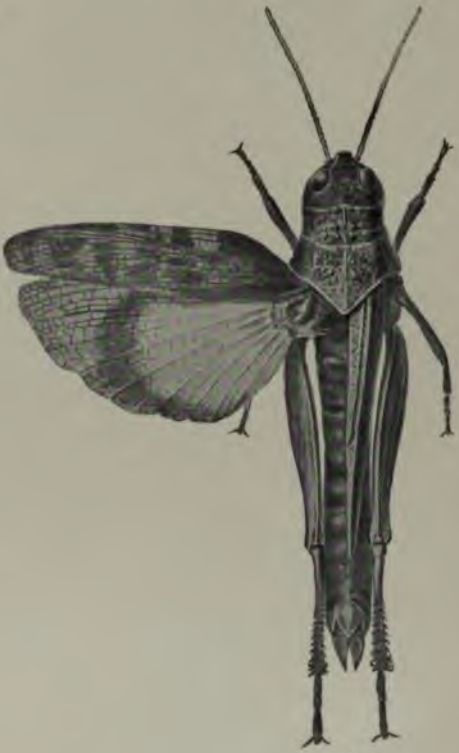

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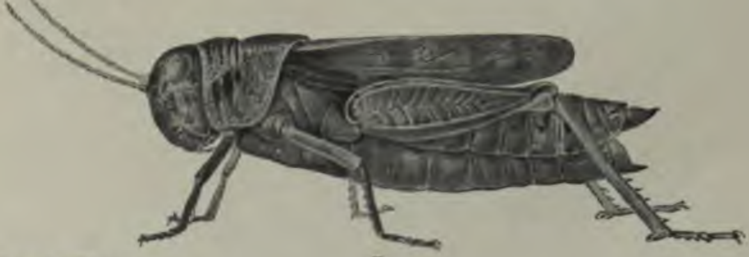

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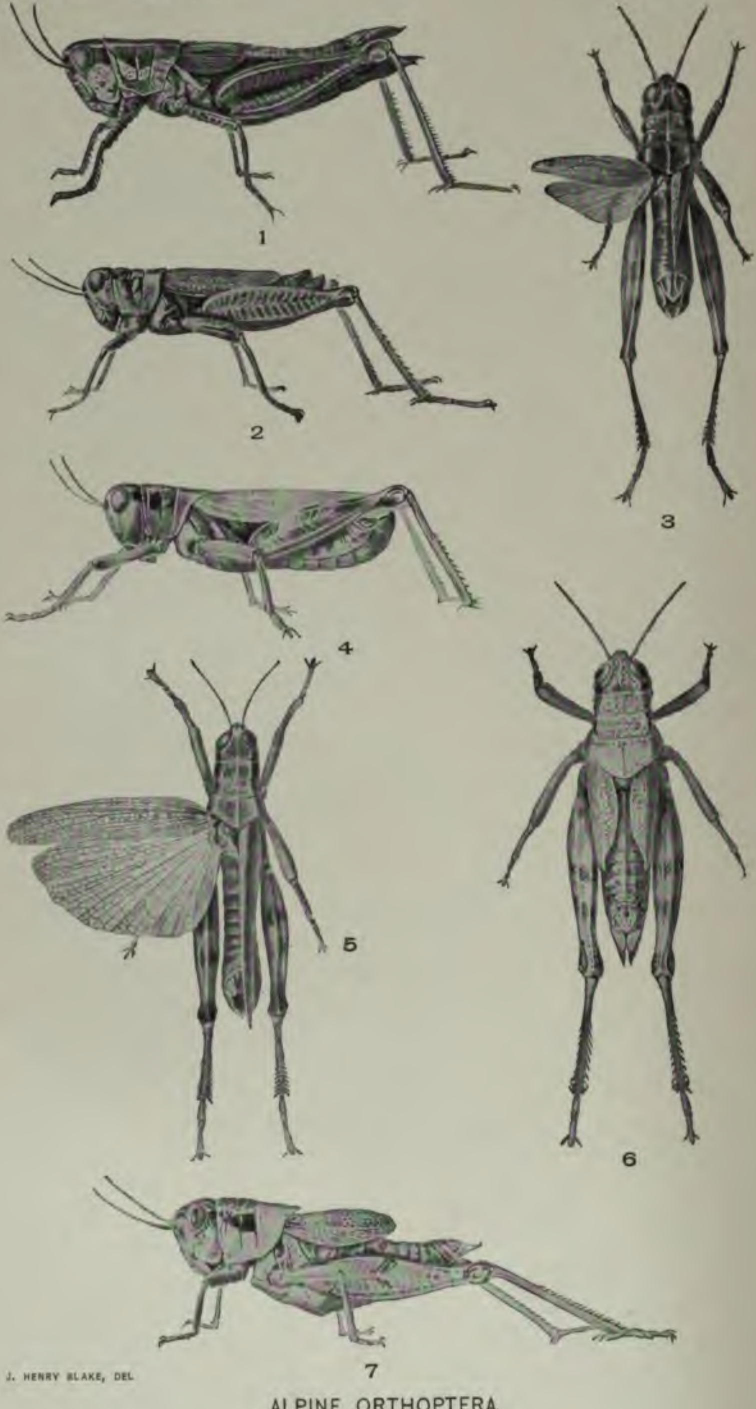
5

ALPINE ORTHOPTERA.



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ALPINE ORTHOPTERA.

Mountains it is found not only in the valleys, but in the subalpine portion of the barren summits, and has been recorded by Mrs. A. T. Slosson from above 5500 feet, but it can hardly be called in any strict sense an alpine insect. In Colorado, I do not know of its occurring above 7000 feet. This insect has been figured many times; a good side view will be found in Harris's Treatise on injurious insects, 3d ed., pl. 3, fig. 2.

11. **Camnula pellucida** (Scudder). This is a northern insect, found in Canada and the northernmost United States from ocean to ocean. In New England it is entirely or almost entirely confined to the northern parts, where it is extremely abundant, but a single specimen has been taken in Connecticut. It occurs in Massachusetts only in the higher parts. It would have no place in our list, but that it is found sparingly in the alpine region of the White Mountains, even to the summits. A figure of the insect will be found in the Second Report of the U. S. Entom. Comm., p. 242.

12. **Hippiscus tuberculatus** (Palisot). Mrs. A. T. Slosson has taken a single specimen of this clumsy but conspicuous Œdipodid with brightly variegated hind wings, near the summit of Mt. Washington, on the sedgy slope near the beginning of the path down toward Tuckerman's Ravine. It is the only specimen known to me to have been taken above the forest line, and, though Mrs. Slosson reports seeing two others, can hardly be looked upon as a constant inhabitant of the upper regions; but it is a northern species, common in the spring (when it attains its growth) in all our northern states east of the Rocky Mountains, and throughout Canada as far north as the arctic regions. I have seen specimens from the upper Mackenzie River and Great Slave Lake. A complete account of its distribution, with details, will be found in Psyche, Vol. VI., p. 303, and a figure of it may be seen in Glover's Illustrations of N. A. Entom., Orthopt., pl. 5, fig. 4.

13. **Hippiscus altivolus** Scudder. Pl. XLI., figs. 4, 5. This insect belongs to a prolific genus, most of whose members are found on the continental plateau, 4000 to 8000 feet above the sea. This single species, however, is known only from above the forest line, and, with its exceptionally abbreviated wings, appears to be a truly alpine type. It was taken by me

on the side of Mt. Lincoln, Colorado, 11,000 to 13,000 feet above sea level, on August 13; and by L. Bruner at Como, Colo., at about 9500 feet, July 16.

No one of the last four species has any European representative.

14. **Circotettix undulatus** (Thomas). Widely spread throughout the Rocky Mountain region, this insect occurs in the elevated parks of Colorado and occasionally is found next the upper limits of the forest. It is reported by Cockerell as found near the Macawber mine, at an elevation of about 10,000 feet, but it cannot be strictly regarded as an alpine insect. It is very noisy in flight, and may be heard fifty rods away.

15. **Circotettix maculatus** Scudder. I have taken this smaller and less boisterous Circotettix in the neighborhood of Truckee, Cal., near Donner Lake, at the base of the Sierra Nevadas, but it was first obtained from their summits by the late Mr. Henry Edwards. Its stridulation during flight is decidedly softer and more subdued than that of its crackling congeners. It was also taken last summer, August 12, by Mr. A. P. Morse, at Cloud's Rest in the Yosemite Valley, where it was found on the bare ledges, 8500 to 9000 feet, and nowhere else; it was "scarce, active, and shy." A good figure of the insect is given in the Second Report of the U. S. Entom. Comm., pl. 17, fig. 10.

16. **Circotettix verruculatus** (Kirby). This grasshopper, well known wherever it is found for the sharp, crackling rattle it makes in its generally short, but occasionally prolonged, circling flight, is widespread over our northern country from Nova Scotia to Vancouver. In New England it is common enough in the northern half, but rarely found in the southern, except in elevated localities. It has been taken on Mt. Tom and on Greylock in Massachusetts, and is very abundant in the White Mountain region, where Mr. A. P. Morse has even found it above the forest line to within a few rods of the Summit House on Mt. Washington. A figure of the insect will be found in Glover's Illustrations of N. A. Entom., Orthopt., pl. 10, fig. 6.

17. **Circotettix suffusus** (Scudder). This species, perhaps only a variety of the last, was found last summer by Mr. A. P.

Morse, close to the forest line on Mt. Shasta, California. It is widely spread at tolerably high levels in California, Oregon, Washington, and British Columbia, as also in Nevada, Utah, and various parts of Colorado and Wyoming. I have taken it as far south as Garland, near the Veta Pass, Colorado. At Evanston, Wyo., I noted that during its flight it made a clacking sound with its wings, lasting from a quarter of a minute to a minute and a half, which was made up of a succession of sharp clacks, usually at the rate of about five per second, but occasionally, and especially just before alighting, hurrying to six per second.

The American genus Circotettix is represented in the Old World by Bryodema, of which one species occurs in eastern Europe, and is found up to a height of 5000 to 6000 feet in the Tyrol.

The last two species of Circotettix form a passage to the genus Trimerotropis, which is widely distributed at lower levels all over North America. Mr. A. P. Morse took last summer in California two species of Trimerotropis, not yet determined and perhaps new, one (18) at Cloud's Rest in the Yosemite Valley (8500 to 9000 feet), the other (19) on Mt. Shasta at an elevation of 7500 to 8000 feet. He thinks he has taken the same species at lower levels in the same vicinities.

We now pass to the Acridiinæ.

20. **Paradichroplus mexicanus** (Brunner). Pl. XLI., fig. 3; Pl. XLII., fig. 1. Excepting *Melanoplus borealis*, this is the only insect in our list which is not found in the United States. It occurs on the slopes of Mt. Orizaba in Mexico. Specimens received from Prof. L. Bruner were taken by him at an altitude of 11,500 feet. It was originally described as found by Sallé "au pied de la neige." Mr. W. S. Blatchley informs me that at the time of his visit the snow line was at 15,000 feet, and adds that he took a single specimen at 13,500 feet; "a very few individuals may have been taken as low as 9000 feet, but the species was common only between 10,000 feet and 12,000 feet; above 12,000 feet scarce."

21. **Bradynotes obesa** (Thomas). This clumsy insect was taken many years ago near the forest line on Mt. Shasta, California, by Dr. A. S. Packard. It is also found in elevated

localities, but below the forest line, in the Sierra Nevadas and in Idaho, Nevada, and Montana. Last September it was again taken on Mt. Shasta by Mr. A. P. Morse, who found it "common, almost plentiful, a quarter or half a mile below Horse Camp; one example was taken at the Camp." It is a sluggish and clumsy insect and "in life of a purplish cast of color." "Horse Camp," says Mr. Morse, "is at 7500 to 8000 feet altitude, and just at the timber line. There are scattered trees about it and heavy forest immediately below, except on the pumice-stone plateau, where the grasshoppers were found. There is no vegetation above Horse Camp suitable for grasshoppers to feed on; nothing but rocks and snow with a few spindling plants. Timber grows all around the pumice-stone plateau and in places on it. The most noticeable plant there is the yellowish flowered" *Aplopappus bloomeri*, var. *angustatus* Gray, as kindly determined for me by Dr. B. L. Robinson. The insect has been figured by Glover, in his Illustr. N. A. Entom., Orthopt., pl. 11, figs. 13, 14.

22. **Bradynotes referta** (Scudder). This probably occurs over much the same region as the last, but has been taken only on the mountains about Lake Tahoe, California, and at or near timber line on the north slope of Soldier Mountain, Idaho. Neither of these species of Bradynotes can be regarded as strictly alpine.

The genus Podisma, to which we now come, is more strictly alpine than any other group of Orthoptera. Of the eight American species all but two have occurred above the forest line, and several of them are almost exclusively alpine. A similar statement can be made of the European species, which are more abundant than ours, ten of them being known as alpine or subalpine, several of which occur also at lower levels in the high north.

23. **Podisma glacialis** (Scudder). It is this insect which first gave me my interest in alpine grasshoppers. More than thirty-five years ago, as I used to climb the footpath to Mt. Washington from the Peabody valley, now wholly overgrown, one of the first creatures to catch my eye as I emerged above the forest at the Ledge would be this wingless grasshopper, then first found, in the clumps of dwarf birch, *Betula nana*.

Since then I have taken it many times at various points in the lower or subalpine portion of the barren summits of the Great Range, and it has also been taken elsewhere below the forest line, but it may be regarded as strictly a subalpine insect. In the White Mountains I have taken it from the neighborhood of the snow bank in Tuckerman's Ravine (about 4000 feet) to the base of the rocky slopes of the northeastern side of Mt. Washington above the Alpine Garden, and at the summit of Mt. Madison, 5380 feet, at about the same elevation as the last. I have also found it at the upper limits of Huntington's Ravine and about the Ledge on the carriage road. Outside the White Mountains it has been taken in New Hampshire on Kearsarge, 3250 feet, by Mr. A. P. Morse; in Maine, on the summit of Ktaadn, 5200 feet, by the same; at Jackman, on the Canadian border, by Prof. F. L. Harvey; on the Magalloway River in Oxford County, by the late Mr. F. G. Sanborn; and on Speckled Mountain, 2000 (?) feet, in the same county, by Prof. S. I. Smith and Mr. A. P. Morse. In Massachusetts it is only known from the summit of Greylock, 3500 feet, where Mr. A. P. Morse and I have taken it. In New York it was found on Mt. Marcy, 5400 feet, by Mr. F. G. Sanborn, and near Chateaugay Lake, 2000 feet, also in the Adirondacks, by Mr. F. C. Bowditch. Finally, I have taken it at a relatively low level at Sudbury, Ont., and it has recently been reported from North Mountain, Sullivan Co., Penn., at a height of about 2600 feet.

The European species to which it is most nearly allied is *P. baldensis* (Krauss), which occurs on Monte Baldo in southern Tyrol, at a height of about 5000 feet. A more closely allied American species, *P. variegata* Scudder, occurs in western New York and north of Toronto, Canada, at relatively low levels. I do not figure *P. glacialis*, because it has already been frequently illustrated; see Bost. Journ. Nat. Hist., Vol. VII., pl. 14, figs. 9, 10.

24. **Podisma nubicola*** Scudder. Pl. XLII., figs. 2, 3. This is an alpine grasshopper which I took August 13, 1877, on the sides of Mt. Lincoln, Colorado, 11,000 to 13,000 feet above sea level. It has never been taken elsewhere, but will doubtless be found in similar situations in Colorado.

25. **Podisma stupefacta** (Scudder). Pl. XLII., figs. 6, 7. This is another purely alpine grasshopper, first described from Taos Peak, 13,000 feet, in the Sangre de Cristo Mountains of northern New Mexico, where it was taken by Lieutenant Carpenter. The United States National Museum contains specimens from Riley's collection coming from Colorado, and marked simply as "alpine."

26. **Podisma dodgei** (Thomas). This is perhaps the commonest alpine grasshopper in Colorado, sure to be taken by any entomologist who there climbs above the forest line. I have myself found it on Sierra Blanca, August 29, 12,000 to 13,000 feet; and on Pike's Peak, August 24, 12,000 to 13,000 feet; Morrison took it in Colorado at 13,000 feet, and Cockerell on Brush Creek at 12,000 feet. I have also taken it at Georgetown, Colorado, July 12–13, 8500 to 9000 feet, and at Beaver Brook, July 11, 6000 feet, and Uhler found it on the mountain sides in Clear Creek Cañon. It has also been taken in North Park by L. Bruner, and, according to Riley, at Poudre River. Thomas says that the late J. D. Putnam took it in "alpine" and "subalpine" stations in Colorado. Other localities outside of Colorado are Laramie, Wyo., and Montana, according to Professor L. Bruner; and the Wasatch Mountains near Beaver, Utah, where Dr. E. Palmer collected specimens. It has been figured by Glover in his Illustr. N. A. Entom., Orthopt., pl. 11, figs. 4, 5, 9.

The European insect most nearly allied to this is *P. pedestris* (Linn.), a species which occurs in Finland, southern Sweden, and Holstein; then further south it reappears in the high Alps of Switzerland, as at the Wengern Alp and the Rhone Glacier, and in the mountains of southern Bavaria and the Tyrol; farther east it comes down to the hill country, and occurs from Carinthia eastward to the Volga. South of the Alps, it occurs among the mountains of southeastern France, in Sardinia and southern Tyrol.

27. **Podisma marshallii** (Thomas). This species was originally described from the "mountains of southern Colorado," and no more definite statement of its occurrence has been made until recently. The only place where I have taken it is Mt. Lincoln, Colorado, where it was common at an elevation of

11,000 to 13,000 feet, on August 13. In my account of a trip to Sierra Blanca in Vol. I. of APPALACHIA, I spoke of its occurrence there; but this was a mistake, the species found there being *P. dodgei*. *P. marshallii* has been figured in the Report of the Wheeler Survey, Vol. V., pl. 45, fig. 3.

28. **Podisma oregonensis** (Thomas). The only claim this grasshopper has to a place in a list of alpine insects is that Professor L. Bruner has taken it "at or near" the forest line on the northeast slope of Soldier Mountain, Idaho. It occurs also at Henry Lake in Idaho, in the Yellowstone region of Montana, and at Fort McLeod in Alberta. It was originally described from Oregon.

The number of alpine species in the genus Melanoplus — a strictly American genus — is even greater than in Podisma, but the proportion of non-alpine species is vastly greater still, Melanoplus being exceptionally prolific in species, of which we now know more than one hundred and thirty. The following may be regarded as strictly alpine or as sometimes occurring in alpine districts, the former being figured.

29. **Melanoplus excelsus** Scudder. Pl. XLII., figs. 4, 5. The only specimens known to me are those taken by myself August 13, 1877, above timber on Mt. Lincoln, Colorado, 11,000 to 13,000 feet above sea level; and those lately sent to me by Mr. C. F. Baker, which he took at Rabbit Ears Pass, Routt County, Colo., at a height of 10,000 feet. The nearest ally is a species with slightly longer wings, found in the Cordilleran region.

30. **Melanoplus atlanis** (Riley). This species has an immense range, greater than that of any other species of this multitudinous genus, being indeed found in nearly every place where any species occurs; it practically covers the whole of North America north of Mexico, and is found far within Mexico itself. Its claim to a place in this list is that in New England it is found everywhere from the seashore to the tops of the highest mountains of New Hampshire, being tolerably common on the summit of Mt. Washington, whence it has been brought by numerous persons. In the West I find no report of its attaining very high elevations, the highest known to me being 9500 feet in the American Fork Cañon, Utah, where I

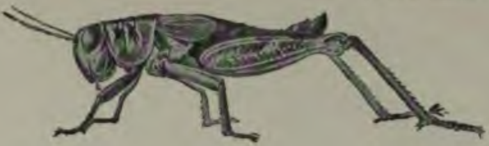
took it in 1877. This species has been repeatedly illustrated, the best figures being found in the First Report of the U. S. Entom. Comm., pl. 3.

31. **Melanoplus spretus** (Uhler). This is the destructive or "Rocky Mountain locust" of the West, whose home is on the arid high plateaus, whence it flies to immense distances, crossing the highest mountain ranges on the way. I have found the dead bodies by the handful beneath the loose stones and in crevices on the highest summits, and have also taken it alive in every stage of development on Mt. Lincoln, Colorado, August 13, 1877, 11,000 to 13,000 feet above sea level; at Sierra Blanca, however, I found none above timber line, though it occurred below. Dr. Packard took it on Pike's Peak and Lieutenant Carpenter on Taos Peak in New Mexico. It has been figured very many times; the best illustrations are in the First Report of the U. S. Entom. Comm., pl. 1.

32. **Melanoplus gillettei** Scudder. Pl. XLIII., figs. 1, 2. This is a subapterous species taken by Mr. C. F. Baker at Rabbit Ears Pass, Routt County, Colo., 10,000 feet, Cameron's Pass, 11,800 feet, and Clark's Peak, 11,700 feet, in northern Colorado. Its nearest allies are widely spread over the continent.

33. **Melanoplus militaris** Scudder. This rather short-winged grasshopper may perhaps be strictly an alpine insect, since the only place from which it has been brought is Soldier Mountain, Idaho, where Professor L. Bruner found it "at or near timber line." The allied species all occur in the region between the Mississippi and the Rocky Mountain district, or in the latter.

34. **Melanoplus altitudinum** (Scudder). Pl. XLIII., figs. 3, 5. This short-winged species has been taken on Harney's Peak, South Dakota, at a height of 7000 to 8000 feet, by Professor L. Bruner; and on Taos Peak, Sangre de Cristo Mountains, New Mexico, 13,000 feet, by Lieutenant Carpenter; it is also widely distributed below the forest line, but at high levels, as it has been found at Fort Ellis, Mont., Eaglewood, S. Dak., Custer in the Black Hills, S. Dak., Fort McKinney, Wyo., Poudre River, Colo., at the mouth of the Big South, Laramie County, Colo., 8000 feet (Baker), and at Pine Ridge in the



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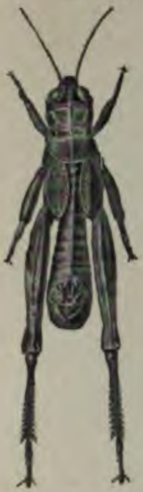

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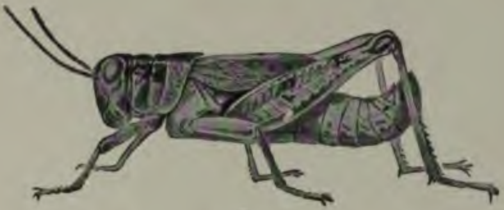

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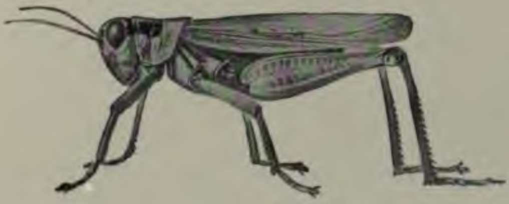

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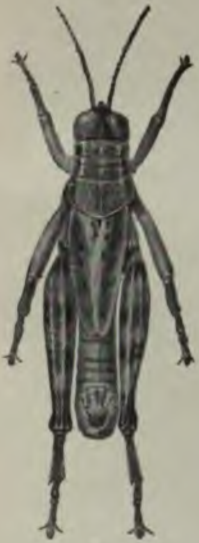

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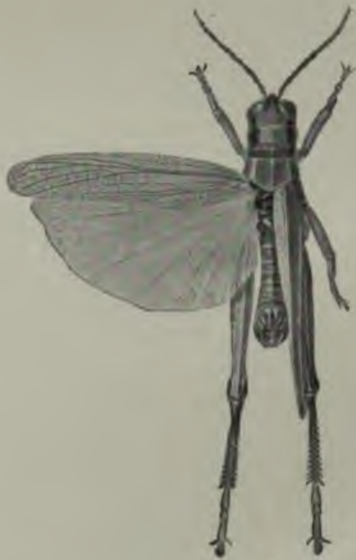

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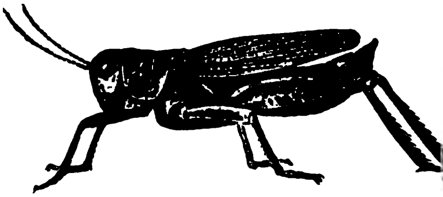
ALPINE ORTHOPTERA.

APPALACHIA, VOL. VIII. PLATE XLIV.



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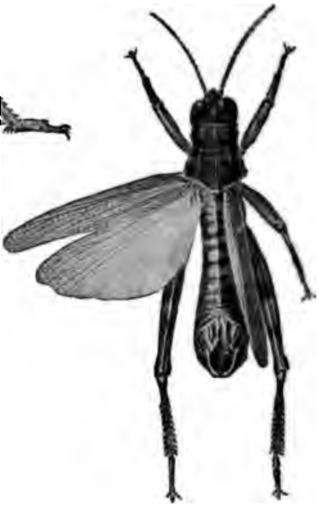

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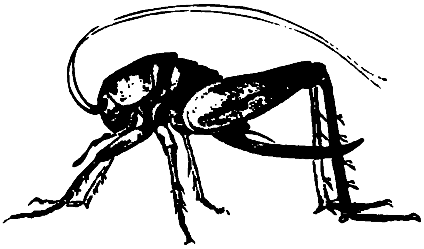

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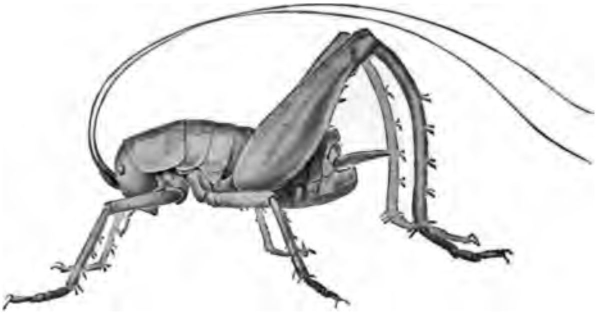

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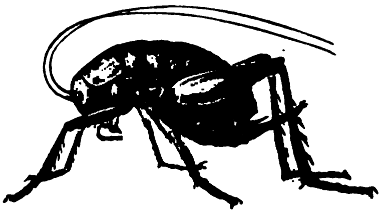

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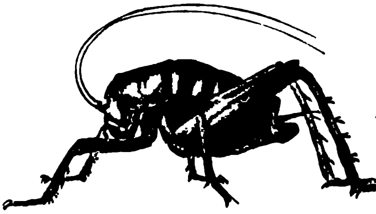

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J. HENRY BLAKE, DEL.

ALPINE ORTHOPTERA.

extreme northwest of Nebraska. Most of these localities are to be credited to Professor L. Bruner.

35. **Melanoplus ascensus** Scudder, MS. This still unpublished and subapterous species was found in scanty numbers at the end of August and early in September last year by Mr. A. P. Morse, on the pumice-stone plateau (see *Bradynotes obesa*, No. 21) just below the forest line on Mt. Shasta, California. It was also taken by him at Portland, Oregon.

36. **Melanoplus borealis** (Fieber). This is rather an arctic than an alpine species, being found in the "barren grounds," that is, the region north of timber, of the north of Labrador, where it was taken recently by Mr. J. D. Sornberger at lat. 59°. It is also reported from Hudson Bay, Greenland, and the North Cape in Norway, but the last locality is very doubtful, as it has never been verified.

37. **Melanoplus femur rubrum** (De Geer). This is the commonest grasshopper of the eastern United States, and extends over the greater part of North America. In New England it is found everywhere, not only in the lowlands, but on the summits of all high mountains, including Mt. Washington, where it is common in both the alpine and subalpine districts. In the Rocky Mountain region, however, I have never heard of or seen it from above 8000 feet. This locust has been very many times figured; the best illustrations are in the First Report of the U. S. Entom. Comm., pl. 2.

38. **Melanoplus extremus** (Walker). Pl. XLIII., figs. 4, 6. A species found throughout the greater part of Canada and the northernmost portions of the United States, reaching north into Alaska. In the Big Horn Mountains of Wyoming it was found at a height of 8000 to 9000 feet by Professor L. Bruner, and it is a common species on the barren summits of the White Mountains of New Hampshire. It is a dimorphic species, appearing in two forms, one (*scandens*) with long wings; the other (*junius*) with the organs of flight somewhat abbreviated, the tegmina when closed not reaching the tips of the hind femora. Strange to say, although alpine insects are in general short-winged, it is the long-winged form (*scandens*) only which affects high latitudes and altitudes, it being, so far as known, the exclusive form of alpine districts and at least the

prevailing form in the high north. It is this form also which appears on the summit of Greylock, 3500 feet, in Massachusetts.

39. **Melanoplus monticola** Bruner. Pl. XLIV., figs. 1, 2. This species is closely allied to the short-winged form of the last, but differs in some minute particulars, especially in the structure of the male abdomen; it is also a somewhat more robust form. It has only been once taken, by myself, on August 29, 1877, above timber line, 12,000 to 13,000 feet, on Sierra Blanca, Colorado. In my account of this mountain in APPALACHIA, Vol. I., I referred to it under the incorrect name, *Platyphyma montana*.

40. **Melanoplus alpinus** Bruner. This insect was taken by Professor L. Bruner at or near the forest line on Soldier Mountain, Idaho, and has also been taken by him at Henry Lake, Idaho, and at Fort McLeod, Alberta.

41. **Melanoplus femoratus** (Burmeister). This large and common grasshopper ranges north of our boundary from Nova Scotia to British Columbia, and extends as far north as Hudson Bay. In the United States it reaches southward nearly to the Ohio and on the Atlantic coast even to North Carolina, while in the West it is nearly confined to the northern tier of States, though it reaches along the Rocky Mountains to Colorado and along the Sierras to northern California. In New England it is found everywhere, and in the White Mountains extends above the forest line to the summit of Mt. Washington, though it is not found there in any great numbers. Glover has figured this insect in his Illustr. N. A. Entom., Orthopt., pl. 5, fig. 16.

This closes the list of Alpine Acridiidæ; the remaining species belong to the Locustidæ, or family of green, long-horned grasshoppers.

42. **Scudderia pistillata** Brunner. This is our most northern species of the genus, and is found from Nova Scotia and New England to Manitoba and Nebraska and southward at least to Indiana. It is the only species found in the White Mountains, where it invades the subalpine district of Mt. Washington. In my account of the distribution of New Hampshire insects in Hitchcock's Geology of New Hampshire, I wrongly

referred to it, and described its song, under the specific name of *curvicauda.* It is a shy insect which stridulates with an occasional single *tzip* in sunshine, but by night or in cloudy weather is more fearless, repeating the note from four to eight or nine times in rapid succession. It is figured in the Annual Report of the Nebraska Board of Agriculture for 1891, p. 305.

43. **Conocephalus ensiger** Harris. This is one of our nocturnal songsters, the rapid vibration of whose tegmina seems to continue for an indefinite period, producing, at the rate of about five per second, a series of notes on the same pitch each sounding like *chwi.* It rarely sings by day except in cloudy weather, but begins to tune up shortly before sunset. It is widely spread over the northern United States and Canada east of the Great Plains, and in the White Mountains extends into at least the subalpine portion of the barren summits. A good figure of it will be found in Harris's Treatise on injurious insects, 3d ed., p. 164.

44. **Orchelimum vulgare** Harris. This noisy Locustarian has a more complicated note than most of the tribe, interspersing its long continued trills with repeated staccato *tzips.* It is also widely spread over much the same region as the last species, and in the White Mountains is found not only in the subalpine, but even the alpine zone of the barren summits, though never found there in great numbers. Mr. A. P. Morse has taken it on Greylock in Massachusetts. This species also is figured in Harris's Treatise, 3d ed., p. 162.

45. **Anabrus coloradus** Thomas. This ungainly, subapterous, but nevertheless very noisy Locustarian was found by me on August 13, above the forest line on Mt. Lincoln, Colorado, swarming at every footstep, wherever there was any vegetation worth eating, up to at least the height of 13,000 feet. I was the more surprised, therefore, not to find it above the forest line on Sierra Blanca a week later, especially as it had accompanied me in the open places on the ascent between about 9000 feet and 10,000 feet. I also took it in the Argentine Pass, July 16, at a height of 13,000 feet, and Baron Osten Sacken found it at the same height on Gray's Peak, as did Lieutenant Carpenter on Taos Peak, Sangre de Cristo Mountains, New Mexico. It is, however, found also at lower levels, for I have taken it in

Colorado at Florissant, 8000 feet, August 17–22, and in the South Park, 8000 to 10,000 feet, August 11–15. The late Mr. Morrison took it in undesignated places in Colorado at the height of 5500 feet and 8000 feet, Mrs. F. H. Chapin sent me a specimen from Estes Park, and Lieutenant Carpenter found it in southern Colorado. It is pretty certainly this species that was referred to by the late J. Duncan Putnam, when he said (Proc. Davenp. Acad. Sc., Vol. I., p. 266), "High up above timber line on Gray's Peak and on other peaks near Empire City, I collected a number of specimens of a species of Anabrus." The species was originally described from "eastern Colorado." I possess also specimens of what appear to be this species from Texas. It has been reported from southwestern Kansas and southwestern Nebraska. To the north it is replaced by other species. This insect is figured in the Second Report of the U. S. Entom. Comm., p. 163, but under a different name.

46. **Ceuthophilus terrestris** Scudder. This wingless and therefore silent Locustarian occurs throughout New England and as far south as Maryland and north as far as Anticosti in the Gulf of St. Lawrence. Mrs. A. T. Slosson has taken both sexes under stones at the summit of Mt. Washington; the female taken has unusually long hind femora for this species. The insect has been figured by Glover in his Illustr. N. A. Entom., Orthopt., pl. 7, figs. 4, 5, under the name of *C. lapidicola.*

47. **Ceuthophilus valgus** Scudder. Pl. XLIV., figs. 3, 4. This seems to be a subalpine form, occurring in Colorado. I have taken it only in the South Park, 8000 to 10,000 feet in August. It has also been taken in Colorado by Morrison, between 7000 feet and 8000 feet, by Cockerell at Brush Creek, Custer County, 10,000 feet, and at Granite, Chaffee County, 8800 feet. A doubtful specimen comes from Pueblo, 4700 feet.

48. **Ceuthophilus alpinus** Scudder. Pl. XLIV., figs. 5, 6. An alpine form, allied to the last, and like it known only from Colorado. I have taken it in the South Park, 8000 to 10,000 feet, as well as above the forest line, 11,000 to 13,000 feet, on Mt. Lincoln, in August. I have also received what appears to be the same species from Mr. C. F. Baker, taken under stones at Fort Collins, Colo., about 6000 feet.

EXPLANATION OF THE PLATES.

All the drawings are by J. Henry Blake, and are magnified two diameters.

PLATE XLI.

Fig. 1. *Gomphocerus carpenterii*, ♂, dorsal view; Colorado.
2. The same, side view.
3. *Paradichroplus mexicanus*, ♀, dorsal view; Mt. Orizaba, Mexico.
4. *Hippiscus altivolus*, ♀, dorsal view; Mt. Lincoln, Colorado.
5. The same, side view.

PLATE XLII.

Fig. 1. *Paradichroplus mexicanus*, ♀, side view; Mt. Orizaba, Mexico.
2. *Podisma nubicola*, ♂, side view; Mt. Lincoln, Colorado.
3. The same, dorsal view.
4. *Melanoplus excelsus*, ♂, side view; Mt. Lincoln, Colorado.
5. The same, dorsal view.
6. *Podisma stupefacta*, ♀, dorsal view; Taos Peak, New Mexico.
7. The same, lateral view.

PLATE XLIII.

Fig. 1. *Melanoplus gillettei*, ♂, side view; Clark's Peak, Colorado.
2. The same, dorsal view.
3. *Melanoplus altitudinum*, ♂, side view; Sheridan, Wyoming.
4. *Melanoplus extremus scandens*, ♂, side view; Mt. Washington, New Hampshire.
5. *Melanoplus altitudinum*, ♂, dorsal view.
6. *Melanoplus extremus scandens*, ♂, dorsal view.

PLATE XLIV.

Fig. 1. *Melanoplus monticola*, ♂, side view; Sierra Blanca, Colorado.
2. The same, dorsal view.
3. *Ceuthophilus valgus*, ♀, side view; Colorado, 8000 feet.
4. *Ceuthophilus valgus*, ♂, side view; Colorado, 8000 feet.
5. *Ceuthophilus alpinus*, ♀, side view; South Park, Colorado.
6. *Ceuthophilus alpinus*, ♂, side view; South Park, Colorado.

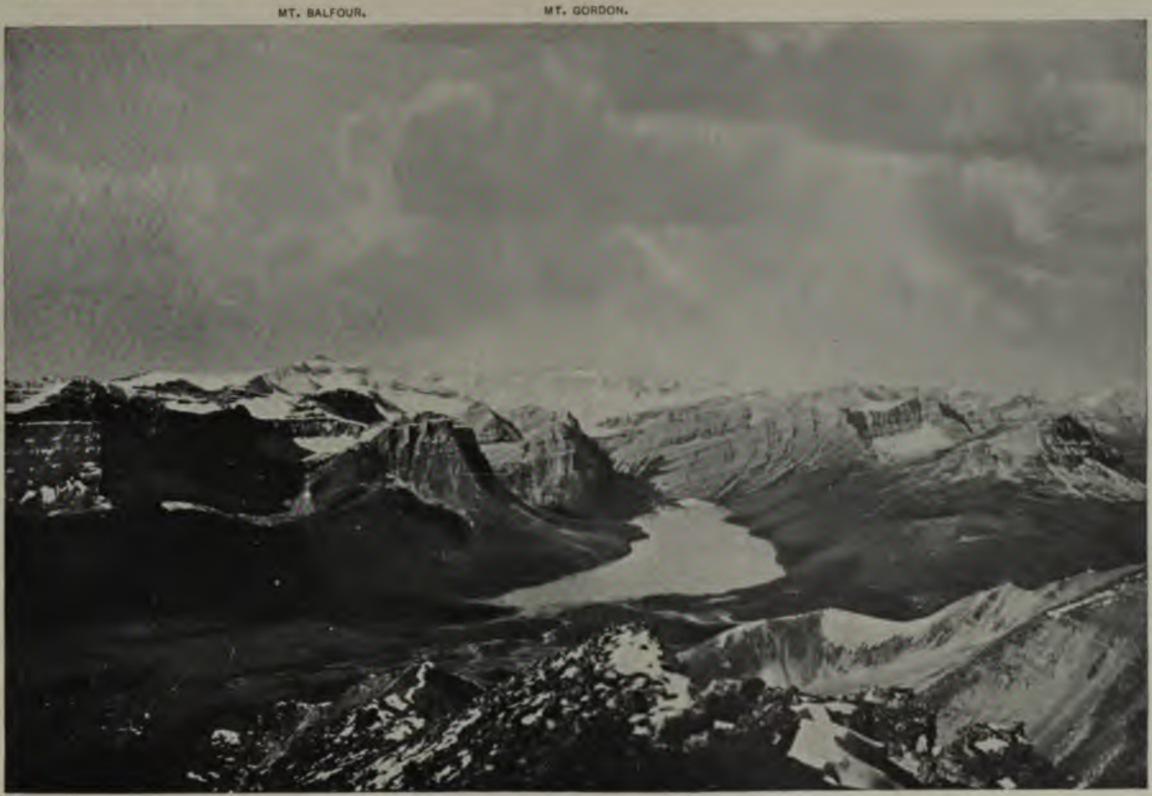
At the Headwaters of the Bow.

BY CHARLES S. THOMPSON.

Read January 19, 1898.

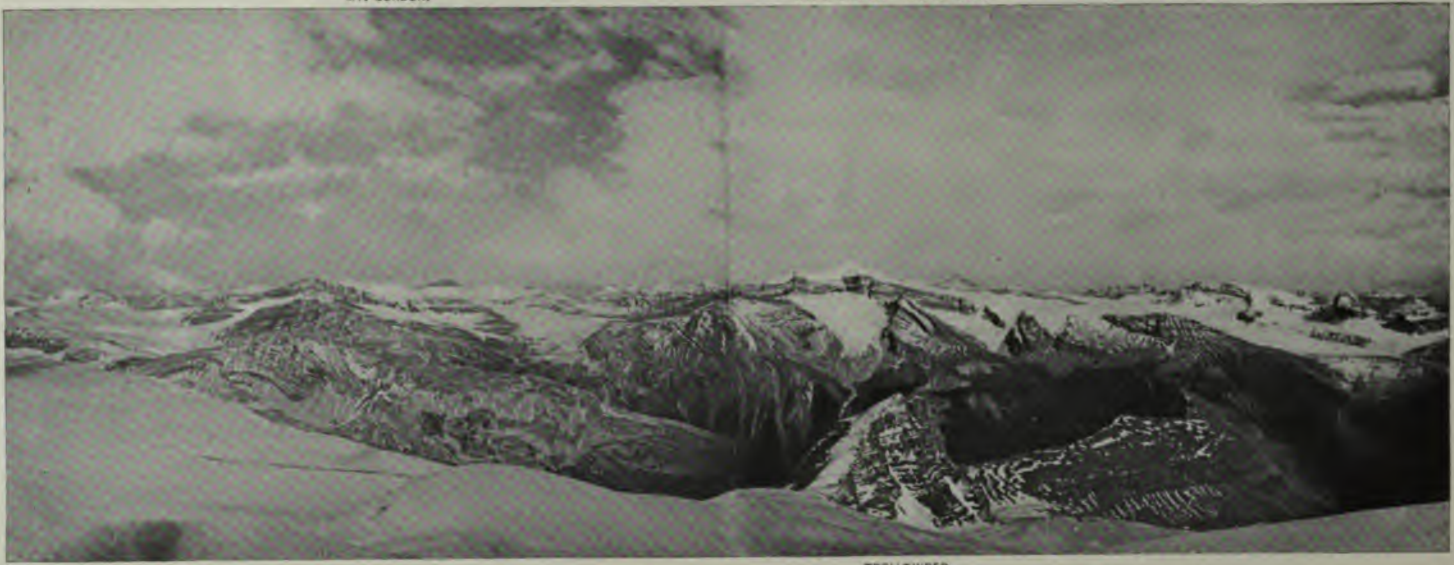
NORTH of Hector Pass, upon a high plateau of the continental watershed, there is a large ice-field. Four rivers, the Blaeberry and the Wapta upon the west and south, the Saskatchewan and the Bow upon the north and east, find their headwaters in its melted snows; their valleys bound it. In outline this ice field resembles a domestic fly at rest, its head toward the north near the entrance of Howse Pass, its wings reaching on the one side almost to Laggan, on the other almost to Field. Between the wings lies the valley of the North Fork of the Wapta, the scene of Habel's recent exploration. From the head to the tip of either wing is about thirty miles; the greatest distance across the body is perhaps twelve. Near as it is to the railway, visible as are three of its discharging glaciers to every passing traveller, this field has never been crossed. Certain expeditions of the Canadian Topographical Survey have touched the western edge, but until this summer no one, so far as we can ascertain, had penetrated to its central snows.

On Saturday morning, August 7, the west bound transcontinental train bringing Baker was four hours late. This delay, dinner, and the packing of Baker's outfit upon an extra horse kept us at Laggan station until two o'clock. Somewhere up the valley, northward, near the hither end of the Lower Bow Lake, Peyto, our packer, and his two men were awaiting our arrival. Close computation left it doubtful whether we could reach their camp before nightfall, but a bed in the underbrush was better than one on the station platform, and the uncertainty was exciting. From the railway to the cabin of Hunter, the miner, a short two miles, our path was easy; halting there, we received a warning. In reply to our question regarding the distance to the lower lake, Hunter answered, with a meaning smile, that it was about fifteen miles, but that before we got there we would think it fifty. Doubt as to the sanity of his judgment — there was none as to his hospitality — vanished with our continued march. Beyond his shelter, the trail was



THE LOWER BOW LAKE AND WAPUTEHK MOUNTAINS.

From a Photograph by the Dominion Topographical Survey.



THE WAPUTEHK SNOW FIELD FROM THE WEST.

From Photographs by the Dominion Topographical Survey.

strewn with fallen trees, singly, in twos and threes, by tens and twenties, weather-beaten, fire-marked, disputing our passage. We might have moved more rapidly but for the two led horses. These heavily laden beasts, trained to such work, knew better than we the limits of their agility. A log breast high made no obstacle, even two were taken marvellously; at more they stood resolutely still. At such moments the party scattered, seeking a passage for them however circuitous, losing thereby the scarcely recognizable trail, and spending precious minutes in its rediscovery. Just before dusk we came to open ground, a series of bogs or muskeags, old lake beds filled by ages of decomposing vegetation, moist and trembling beneath our tread, but during daylight tolerably safe. Across these muskeags there was no path, at best a stake or two — quite invisible when twilight came — marking a way to the farther margin and the renewed trail. With increasing darkness our affairs grew steadily worse. We stumbled constantly through pools of shallow water; the horses floundered behind, often knee-deep in muck, at times stubbornly refusing to move. Then the end came. I stood with one horse upon a tussock of marsh grass, encircled by water, not daring to move. Somewhere before me Collie was calling for aid to Baker and Michael, saying that his horse was mired. Dixon was nursing a lame knee upon the dry root of a neighboring evergreen. Out in the Stygian blackness I heard Noyes splashing indefinitely to and fro. Fay and Parker, lightly loaded, had hastened on some time before, hoping thereby to find the camp and to send Peyto to our assistance. The would-be mountain climbers were undeniably prisoners in the swamp with dawn five hours away. I had strengthened myself for the inevitable, when up the valley we heard the momentary barking of a dog, followed, after twenty minutes of unencouraging silence, by the shouting of Peyto from the farther edge of the morass. So in the end, abandoning our horses and our luggage, we arrived in camp, not too late for a hot supper and a full night's sleep.

On Sunday we held a council. Our camp lay on low ground at a ford of the Bow River about a mile below the lower lake. To the east was Mt. Hector, to the west the precipitous line of the Waputehk escarpment. Beyond the head of the lake, hidden from our view, was Mt. Balfour, a beautiful virgin snow peak, reputedly the highest of the Waputehk group and rising from the snow-field near the point where the right wing, the one reaching toward Laggan, joins the main ice-sheet. North of the lake the main range sent a rocky spur eastward far across our valley. Behind that spur lay the Upper Bow Lake. We had planned to climb Mt. Balfour coincidently with our exploration of the snow-field, and it was still an open question whether the ascent might be made more easily from the upper or the lower lake. Fortunately, as the weather proved on the following day, we decided to break camp and push on to the upper lake.

The signs in the air that Monday morning foreboded evil. Long wisps of cloud floated lazily eastward from behind the Waputehk escarpment, the blue of the sky faded almost into white, and a halo of dancing clouds gathered around the summit of Mt. Hector. Peyto, the personification of energy, found time in the bustle of packing to tell us with a weatherwise smile that the day would probably prove fair, and thus encouraged we suffered our mackintoshes to be packed irrevocably among the camp outfit on the backs of our ponies.

To reach the farther end of the upper lake in one day we were to make a forced march, stopping for nothing, carrying our luncheon of chocolate and biscuits in our pockets. Before us the long spur, already mentioned, so closed the valley that we were obliged in order to outflank it to move in a northeasterly direction toward, and eventually under, the northern foot of Mt. Hector. The character of the trail changed remarkably from that of the preceding Saturday. Curving slowly away from the never visible lower lake, it rose slowly, with comparative freedom from fallen timber, through a delightful woodland, apparently untouched by the plague of fire or axe. The valley narrowed to half its former width.

All this time the signs of foul weather increased. Shortly after we had started, Mt. Balfour became visible in an opening through the trees, then was instantly hidden by a rushing line of clouds that chased across the surface of the ice-field; clouds hid the sun also; it began to rain, at first uncertainly, finally in soaking streams. We trudged mechanically through what seemed an all day's downpour. Very unexpectedly, about two o'clock in the afternoon the rain suddenly ceased, and the mists rolled back upon the higher summits, a curtain rising upon the fairest scene I have yet beheld among those mountains. The narrowed passage between the Waputehk spur and the mountains north of Hector here opened into a great upland meadow, fresh from the washing of the rain, yellow, purple, and white with alpine flowers. Beyond this great sweep of meadow up the valley lay the blue waters of the Upper Bow Lake, half hidden behind a forest of evergreens and sparkling in the afternoon wind. At its farther edge a snow-capped rock peak, still cloud encircled, stood side by side with another sweep of meadow land studded with clumps of trees, rising gently to the north. The warmth and brilliancy of a summer sun illuminated that harmony of green and blue, of gray and purest white. Heretofore I had seen the Canadian Rockies in their severest majesty, a majesty not untouched with grim desolation, with decay and death. Here they were softly beautiful, glowing with life.

We made our camp that night where the northern shore of the lake trends sharply westward, on rising ground in an isolated copse of trees, looking across the upper end of the lake upon a magnificent glacier, an outlet for the great ice-field upon which we so longed to put our feet. Scanning it from the camp it seemed possible to ascend by the southern lateral moraine to some point above its lower ice-fall, thence to cross it by a comparatively level terrace of ice to the northern edge, along which we might outflank the higher and apparently less intricate cascade of ice.

In the early twilight of Tuesday morning, we skirted the lake to the foot of this glacier. Then we came to a fine old terminal moraine, now quite overgrown with forest, extending like an artificial embankment from one side of the gorge to the other, save at one point where the glacial stream had cut a gully to its foundations. Three of us forced a way through this gully, amply repaid for the extra exertion by a sight of the boulder bridge mentioned by Mr. Wilcox[1] in his account of this glacier; the rest of the party, like a certain famous army, first marched up the moraine and then (to be sure on the other side) marched down again.

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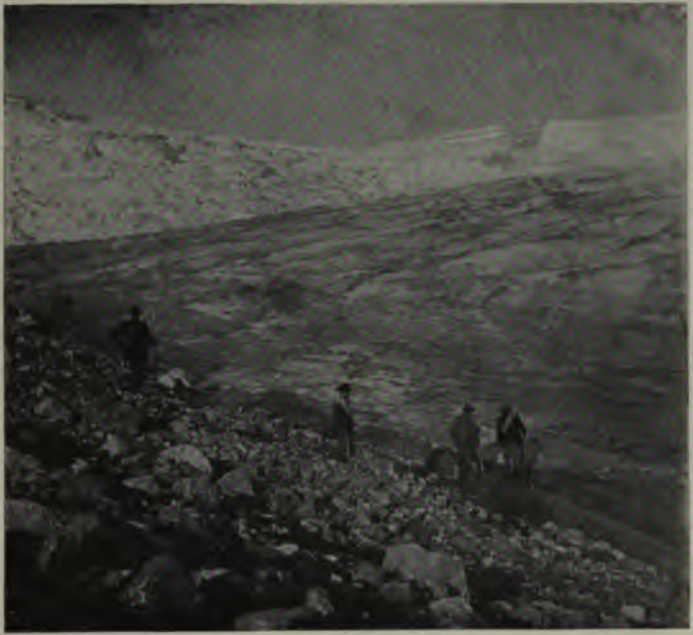
[1] Camping in the Canadian Rockies, p. 204.

The climbing of the southern lateral moraine was simply unmitigated toil. The mud was soft and slippery; the stones on its narrow ridge-pole rolled abominably; the angle of ascent was steep. The plane-table and the other surveying instruments sat with increasing heaviness upon my shoulders, and it was with a gasp of relief that I came to the narrow but relatively level ridge which separates the amphitheatre containing the glacier from another amphitheatre quite as large but comparatively free from ice upon the south.

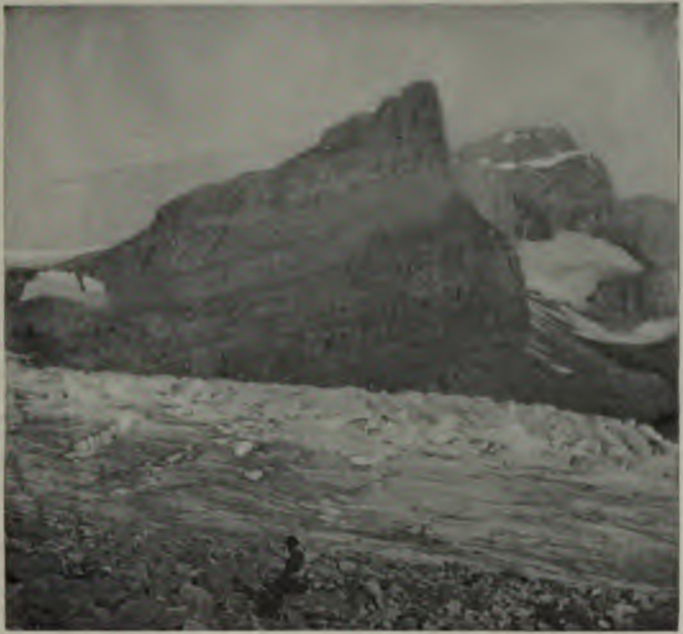
We were now equal in height with the glacial terrace between the two ice-falls. Upon our side of the glacier, the séracs of the upper ice-fall stood in crumbling ranks, with many a white column tottering to a final crash. Moving out upon the terrace opposite to the middle of the fall, their appearance became so much less formidable that Collie and Sarbach, who led their respective ropes, turned sharply up the glacier for a final dash to the as yet only imagined ice-plain which lay beyond. It was a most thrilling and exciting hour. In the difficult mazes of our advance first one party, then the other took the lead with a triumphant cheer. At length Sarbach gave up the struggle, so closely did the crevasses hem us in, and forcing his way to the northern margin, he there easily outflanked the difficulty by climbing along the base of Portal Peak. Of the advance of Collie's party I can speak more definitely. The crevasses seemed endless. Each succeeding one promised easier things beyond, only, when crossed, to be followed by more difficult chasms. We doubled back and forth upon these islands of ice, descending the glacier in order to ascend it, looking down on every hand into bottomless gulfs. At the worst bit, Collie cut us down into the blue depths, and led us magnificently up an almost vertical ice face on the farther side. Beyond this the curving of the gray ice before us became flat. With the eagerness of one scanning the face of a long absent friend, I looked across the Waputehk field.

This is what we saw. A rock-rimmed level ice-plain rising on the south into an almost perfect dome of white, and falling ever so slightly on the north toward two openings in the basin, the source of other great glaciers. Moving across this field were five small black objects, our fellow members on the other rope.



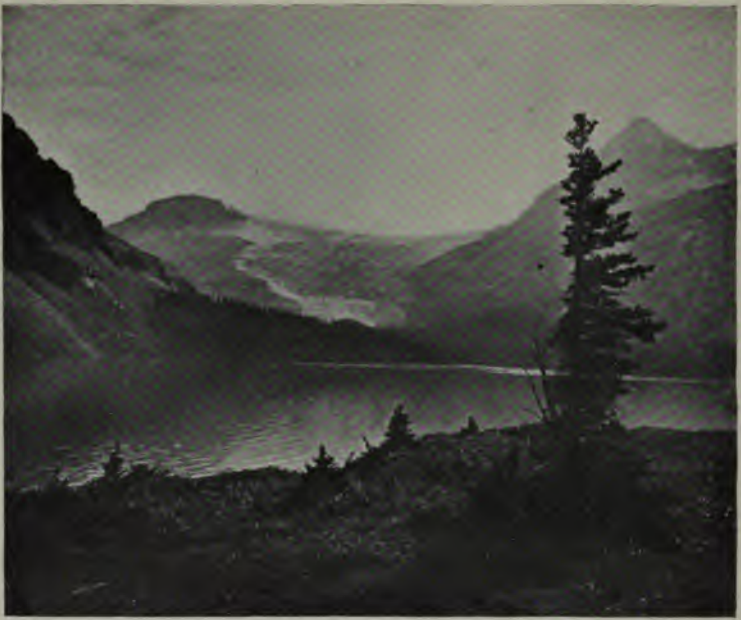
THE UPPER BOW GLACIER.

From a Photograph by C. S. Thompson.



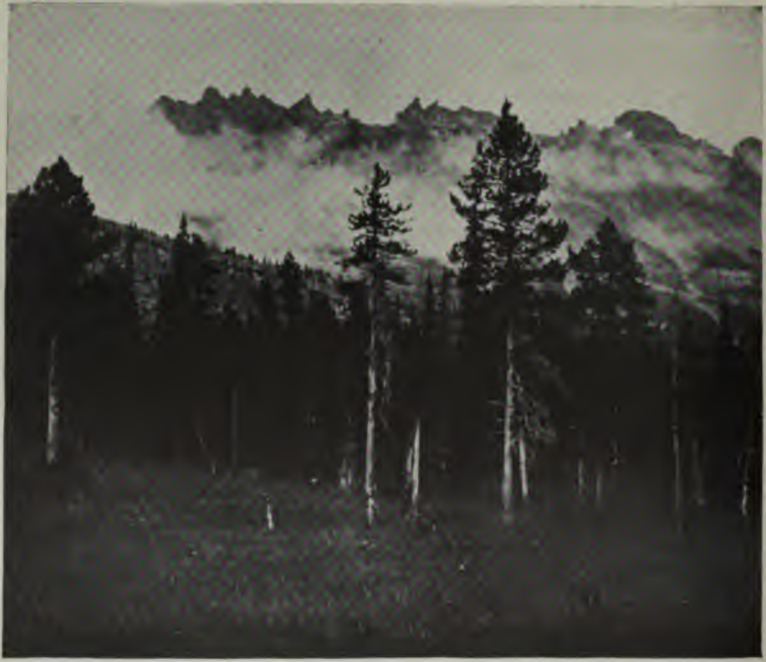
MT. PORTAL.

From a Photograph by C. S. Thompson.



THE UPPER BOW LAKE AND GLACIER.

From a Photograph by C. S. Thompson.



A CANADIAN DOLOMITE.

From a Photograph by C. S. Thompson.

The only visible mountain that could possibly be Balfour was a sharp peak on the southern rim continuous with the snow dome. After eating and drinking, generally in a standing position, for the sun was hot and the snow ran with streams, our entire party hastened toward that peak. "Hastened," for Collie wore seven league-boots, and the rest of us, laden with victuals, labored heavily. We touched the base of the peak at the bottom of a V-shaped notch,[1] a window in the rim looking magnificently upon the glaciers feeding the Lower Bow Lake. Thence by a short, hearty ledge-scramble we were upon the summit of what we later called Mt. Gordon[2] (c. 11,100 feet).

A surprise and a disappointment. Four miles away across a deep ice-swept valley, looking toward us with a vertical fall of two thousand feet was Mt. Balfour, for that day, at least, quite unapproachable. The view presented in compensation was magnificent. We were upon the watershed at the point where the eastern wing of the ice-covered plateau joins the main body, on all sides surrounded by glaciers. To the south, easily recognized in their changed aspect, were the peaks about Laggan. But it was in the north and west that our eyes dwelt longest. There the mountains were gathered together in their sternest mood; there was Mt. Mummery, a beautiful double peak across the valley of the Blaeberry; north of it, the white sweep of the great Freshfield glacier; and, monarch of them all, the great gray spire of Mt. Forbes. It was enough for one day to have seen these things. Some of the party, for the purpose of making a surveying station, followed the ledge to the second peak of Mt. Gordon, the snow dome of which I have already spoken; the others swept around its northeastern face, and thence returned to camp. We arrived there as one party about sunset. On the following day, soaked by a series of showers, we retraced the way to our old camp near the Lower Bow Lake. From that place we proposed, on the next morning, Thursday, August 12, to attempt the ascent of Mt. Balfour.

At some dark hour that morning Sarbach shook himself free from the tangle of blankets within our tent, and stole out, returning presently with a roar of German gutturals and a dubious weather-wise shaking of the head. No one dissented from his decision. To those awakened it was quite immaterial whether Balfour was ever climbed. But after breakfast, slothfulness changed to desire. Mt. Balfour itself was undebateably impossible. The gray sky, the hidden peak of Hector, and the light patches of new fallen snow upon the visible lower slopes told that plainly. Still that was no reason why we might not take the smaller loaf of the Lower Bow (or Balfour) glacier, and ascend thereby to the snow-field under our unattainable mountain. Dixon and Michael had to return at once to Laggan. We watched them disappear down the trail of evil memory, then took our toilsome way through bushes and across an endless talus slope to the head of the lower lake. The sight awaiting us repaid the toil. Turning a corner of the escarpment, we came upon a serpentine glacier with two medial moraines, ending in a fine ice-cave with walls of deepest blue. I remember Collie's genial voice before me, shouting, "Oh, see the beautiful ice-cave; that's where all the tourists get killed!" A momentary halt to admire and photograph it, then away from the glacier up the escarpment at the only point, I think, where it can there be ascended. We lunched upon its side in the midst of a drizzling shower, indifferent to all discomfort, absorbed in the sight before us. Below were the three white ribbons of the glacier; beyond them on the opposite wall of the valley beneath Mt. Gordon was a waterfall of perhaps five hundred feet, dropping in one clear pale brown leap from higher to lower glacier.

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[1] Called by us Vulture Col.

[2] The family name of Lord Aberdeen, Governor-General of Canada.

Behind the top of our escarpment we came into another world. The horizon, narrowly circumscribed, showed nothing but long stretches of snow-covered ice broken by black reefs of protruding rock on which the melting of the snow had uncovered great fields of brown, apparently dead, moss. Now and again, but only in rare intervals where the snow had long disappeared, was the moss green or an alpine flower to be found. The sun breaking through the mist shone brightly through the rain-swept air. Above, not over a mile away, was Mt. Balfour, hidden behind a cloud that now rose tantalizingly, now fell sullenly. A hen ptarmigan ran across our path, gazing curiously at these seven strange creatures new to her experience, and refused to rise when we caught and momentarily held one of her brood. Even this ice world had its brief promise of a resurrection.

We waited in vain for the cloud to lift from Balfour, then slowly turned in a long curve to the edge of the escarpment, which we planned to descend by two lakes, set one above the other in bowl-like depressions, lakes seen by Messrs. Abbot, Fay, and myself from the summit of Mt. Hector in 1895. The lower of these lakes had been named on a former visit, by Professor Fay and myself, Lake Margaret; the higher, on this occasion for the first time visited by man, was named by Mr. Baker Turquoise Lake.

We had no difficulty in gaining the rim of the bowl which separates the higher from the lower lake. On one side, precipice-girt, overshadowed by Pulpit Peak, were the light blue waters of Turquoise Lake; on the other, at the base of a perpendicular wall, forest-encircled, were the dark blue waters of Lake Margaret. Beyond the forest were the light green waters of the Lower Bow Lake. No more remarkable grouping of lacustrine color can be found in all this region, perhaps in all the world. The descent from Lake Turquoise to Lake Margaret is by no means easy, and it was only after some hesitation that we found our way down the many vertical feet of separation. Beyond Lake Margaret, slowly and at our own pleasure, we straggled back to our tents. That evening was our last together in camp. On the following morning we returned to civilization, to Laggan and to Banff.

The North Fork of the Wapta.

By Jean Habel.

Read January 19, 1898.

Travelling westward in the Rocky Mountains on the Canadian Pacific Railroad, and after having passed the Great Divide at Stephen (5296 feet) and the Wapta Lake at Hector (5190 feet), a wild valley is visible to the right, the entrance to which seems to be barred by precipitous, forest-clad mountain walls; its upper terraces are covered by extensive ice-fields. This is the so-called North Fork Valley, — the stream emerging from the same being considered as the right fork of the Wapta or Kicking Horse River, although from a geographical point of view it seems rather to be one of the different affluents of the latter river, the source of which is formed by the Wapta Lake and a few creeks emptying into it. In the background of this hitherto untrodden valley a high, glacier-clad peak is visible from the railway, and to explore the region to a point as high as possible upon this peak was the purpose of the journey which these pages report. This object was attained only partially, the greatest drawback being that, once in the valley, the mountain was lost from sight, and the way leading to its ascent was discovered too late to be made use of. No other name being known to me, I have called the peak "Hidden Mountain."[1]

After having passed the North Fork Valley, the station at Field (4050 feet) is soon reached, where the railway company manages a little hotel and tries to make the traveller as comfortable as possible, — an endeavor which, during my stay, was not always seconded by the persons employed in the house. Making Field my starting point, I left the place on the morning of July 15, 1897, accompanied by Fred Stephens, Ralph Edwards and the cook, Frank Wellman, all three on horseback. Our outfit was carried by four pack-horses, everything having been provided by Mr. T. E. Wilson of Banff, to my great satisfaction. Abstaining from taking a saddle-horse for myself, as the nature of the valley seemed too unfavorable for equestrian exercise, I made the whole trip on foot. After the first day the men had to walk nearly continuously as well. For crossing the rivers, however, one or two saddle-horses are necessary.

As the entrance to the North Fork Valley could hardly be worse from the west, by way of Emerald Lake,[2] than it appeared

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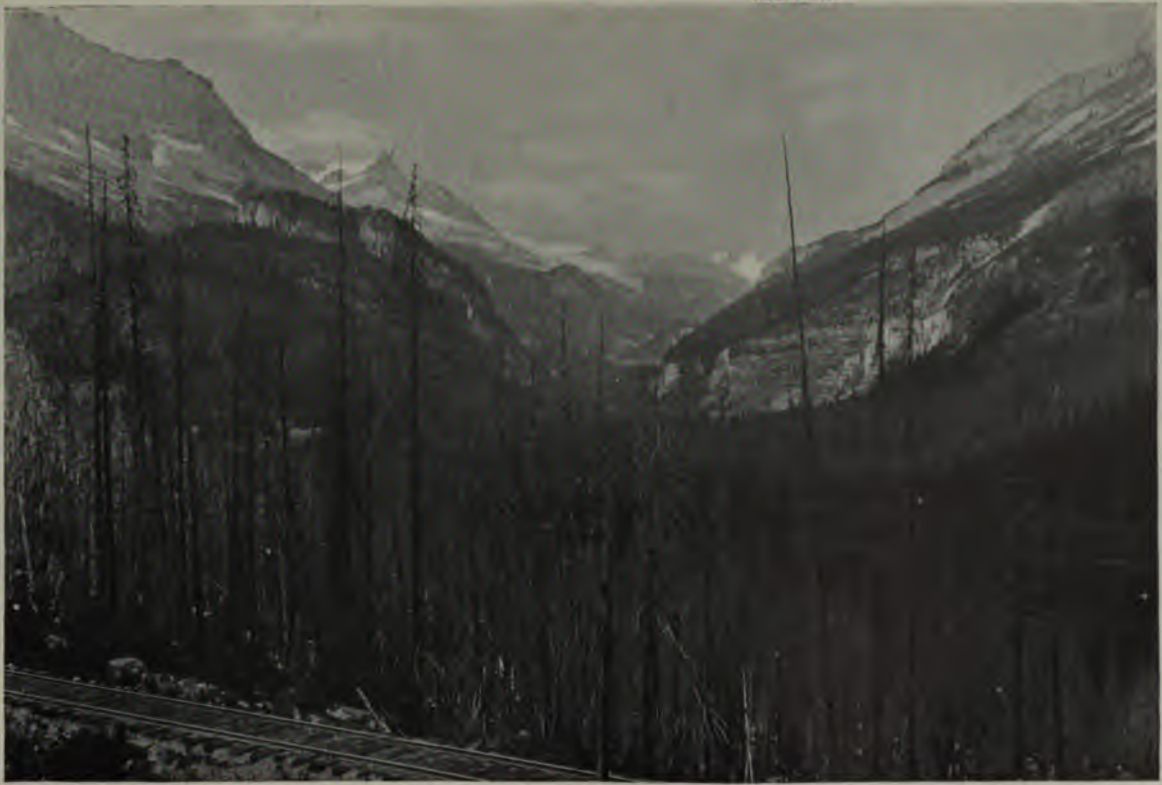
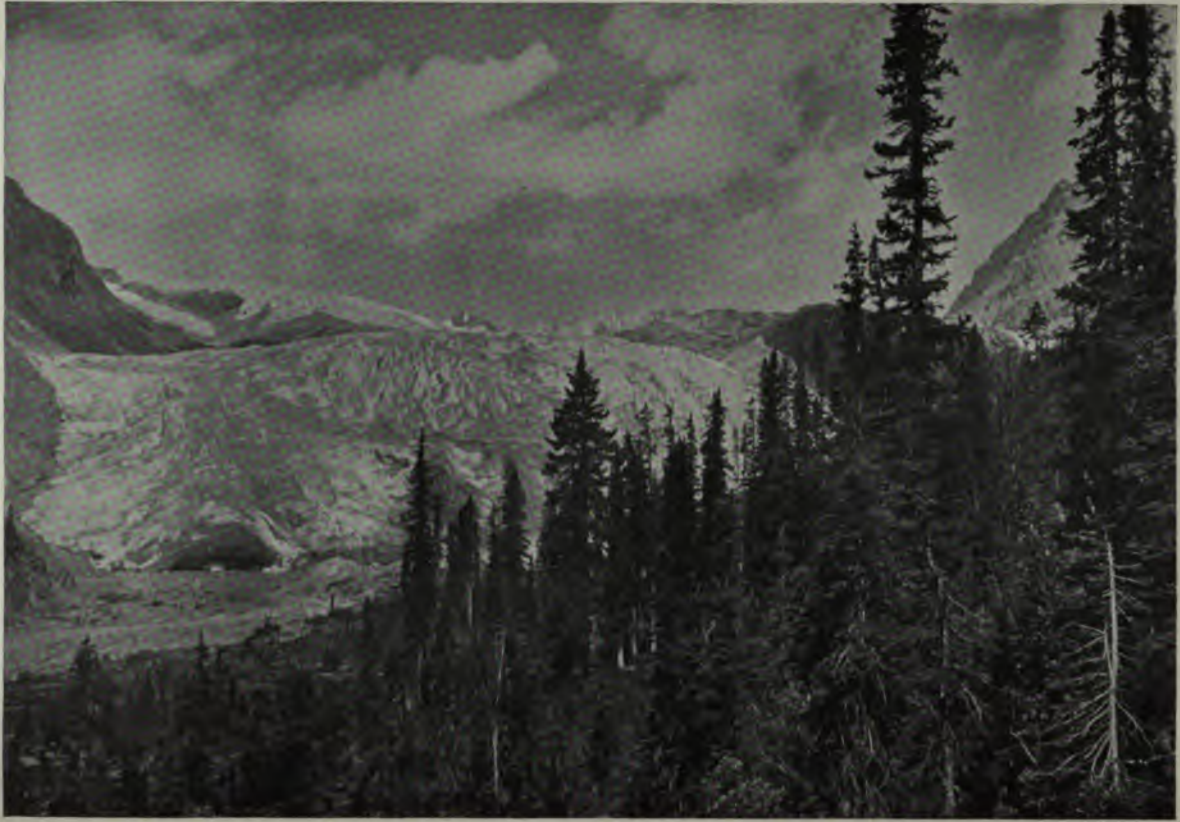
[1] This is the peak mistakenly identified as "Mt. Balfour" in Plates VI. and VIII. of this volume of APPALACHIA. — ED.

[2] A visit to this lake and the Natural Bridge; a walk to the western Ottertail bridge, affording a most beautiful view of the Ottertail Range and the mountains north of Emerald Lake, which fitly may be called Emerald Range; and a walk to an eastern point, opposite the North Fork Valley, or to Hector are three excursions



THE LOWER CANON OF THE NORTH FORK OF THE WAPTA.

From a Photograph by Jean Habel



THE FOOT OF THE WAPTA GLACIER

From a Photograph by Jean Habel.

to be from the south, I decided to attempt it first from that side. In one hour from Field the "Natural Bridge" is reached, where a bar of cambrian slate stretches from one side of the Wapta to the other, with an outflow for the stream in the centre, but easily traversed by *homo sapiens*. The railway company had a bridge built this year over the bar, and our horses were the first to cross it. From the Natural Bridge to the creek flowing from the lake, where another bridge would be convenient, requires another hour, and then, after a third hour's walk from Field on a good trail, leading through a fine forest, Emerald Lake (about 4220 feet[1]) is reached. Our outfit was shipped on board the little craft stationed there, and rowed over by Fred to the northern shore, where we pitched our tents, the horses having been driven around the western side. The lake had a temperature of 55° F.; the numerous little springs rising near its shore and emptying into it, of 42°.

The next morning was a very damp one. To beguile the weary hours I made myself waterproof and entered the narrow valley, which opens to the northwest of the lake. Two hours' walk brought me over the débris of an avalanche to its upper end, a precipitous cirque, with high tilted strata to the west and a hanging glacier to the north, the right side of the latter descending in a narrow ribbon pretty far down. On my way back I met a porcupine on its way up, which passed within a yard of my feet. The morning of July 17 was also damp and cold (5 A. M. 38° F.) With Fred and Ralph I left the camp at eight o'clock to ascertain whether it would be possible to take our horses to a higher camp and find there the necessary feed for them. We traversed the little plain behind Emerald Lake to the northeast, crossed the creeks without difficulty, and moved up the unwooded slopes of the Emerald Range, skirting its perpendicular walls. Coming into forest again, we turned further north and found, after three hours' walk from our

which may be easily made and which will give great satisfaction to any visitor at Field.

[1] This and the following heights have been determined by two aneroids, controlled by the boiling point of the water. The little sketch map, attached to the paper, has been compiled by aid of numerous bearings, taken on the road. It will no doubt be found incorrect and can only be considered as a finger-post for the reader.

camp 1, a good camping ground with two or three days' feed for our horses and water about twenty minutes higher up. Ascending the Emerald Range still further and turning to our right towards the North Fork Valley, we reached in one hour a point (7110 feet) from which a good part of the latter valley could be overlooked. We were here standing on the rim of the extensive hanging glaciers, which cover the northern flanks of Emerald Range. In the background of North Fork Valley a so-called "valley glacier" was visible, descending into it in a fine ice-fall.

The torrent from the hanging glaciers, which cover the eastern terraces of the valley, descended directly opposite to us in a very powerful waterfall. Rushing from under the ice at about the height of our standpoint, this fall plunges over a nearly perpendicular wall down to the very level of the valley bottom in beauty and grandeur hardly to be excelled by any other on our globe. An entire view of the fall can only be got from a point like that at which we stood, and not from the lower parts of the valley. The difference between the height of our standpoint and the foot of the fall is over 2100 feet. From this figure much must be deducted as not of the fall proper, yet it seems no exaggeration to say that the fall is one of the highest in the world, although it certainly does not go down in so vertical a leap as the Yosemite Fall in California. The latter, the height of which is given at 2600 feet, has a first vertical descent of 1500 feet; of the remainder, 600 feet are cascades, and then comes a final plunge of 400 feet. But it is fed by temporary snow-fields, and while in spring it carries a large volume of water, it is greatly reduced in summer, after the snow has melted away. So, too, the fall which is sometimes quoted as the highest in Europe descends for over 1400 feet from the glaciers on the Pic du Marboré into the Cirque de Gavarnie, near the French village of the same name in the Département des Hautes Pyrénees; but its volume is so slight that it reaches the bottom only in spray. The fall in the North Fork Valley, draining parts of the extensive glacier-fields on the western slope of the ridge stretching south from Mt. Balfour, will always have a large supply of water.

On the way back to camp I shot a very fine mountain goat, which, after the fatal wound, following the peculiar habit of its race, went down over a precipice; we found it quite near to our intended camp 2. The meat of this very heavy buck, which the united force of our six arms was unable to lift, proved later on to be very good indeed, in taste like beef. It enabled us to remain longer in the valley than we had anticipated.

As the weather was uncertain, I stopped another day at camp 1, and then, on the 19th, we achieved the difficult task of getting the horses and outfit up to camp 2. The most difficult part of the way was in the wood, where we came upon an old trail. This we left to our right, ascending the steep slope in a zigzag through fallen timber and along the rim of a narrow field of boulders on our left. Crossing the latter, we emerged into a more open space, studded with small fir-trees, on the other side of which we camped (6320 feet). The situation here was most delightful. To the north rose the steep buttresses of the Emerald Range; to the south, Mt. Field, and to the southeast its neighbor, the massive mountain, carrying a small glacier on the platform under its summit, — a peak visible from all our later camps in North Fork Valley and called in the lack of other information, "Mt. Wapta." Over Emerald Lake we looked far down the valley of the Kicking Horse River, flanked on one side by the Ottertail Mountains, on the other by the Van Horne Range, and the Selkirks with Sir Donald (169¼°) in the far distance.

From camp 2 the unsuccessful attempt was made to penetrate further up into the Emerald Range. We left our camp for this purpose at five o'clock in the morning, but were driven back by a severe thunderstorm, after two hours' climbing over difficult ground. The descent on the slippery rocks had to be made very carefully, and at nine o'clock I was glad to be back at camp, though wet through. Next day I started with Ralph to reconnoitre the way down to the North Fork Valley, while Fred looked for the horses, which had wandered away. Both parties returned successful. And so, on July 22, at 7.30 A. M., we left this delightful camp, sorry not to have been favored here by better weather. We managed to get our horses safe and sound down to the old trail, mentioned above. This we followed, reaching at ten o'clock a point (6030 feet) which may be considered as the divide between Emerald Lake and North Fork Valley, and half an hour later a small lake (5940 feet; temperature 52.7°), along which we skirted by its southwestern shore to the outlet. Following for a while this stream, which turns from a northeasterly to a northwesterly course and soon plunges over a precipice, we reached at noon another lake (5570 feet) in shape similar to figure 8. From this lake we descended in forty-five minutes to the level of the North Fork Valley, where not far from the foot of the great waterfall and close to the river we established our third camp (4930 feet).

At eight o'clock the next morning I left the camp, but after an hour's walk decided to wait for the horses at the river. We crossed over to its lower left bank, passed two glacier-streams, and then had to cross back again to its right bank, as the river comes plunging through a narrow gorge. We ascended the steep slope this side of it, through a dripping wood, to a little opening just large enough for our camp 4 (5150 feet), where we arrived at 11.30 A. M., thoroughly wet, of course. Our horses were confined here to a small place between the beginning of the gorge and our camp, and much exposed to wind and weather. At eight o'clock in the evening they bolted, but did not get very far. On this occasion the cook, Wellman, distinguished himself, but came back so perfectly soaked through that I had to have recourse to my own wardrobe to get him dry again. There was fresh snow on the higher parts of the mountains next morning, the temperature being 39° at 5.30 o'clock. After an hour's walk from our camp, I was drenched again by the wet underbrush in the forest. Emerging from the latter, a fine view of the gorge was attained. I was now able to walk, unmolested by wet shrubs, in the open, and to follow the right bank of the river. After another hour I came to a fine fall, very picturesque but of no great height. I was just able to cross the creek forming the fall, but a few yards further on had to wait an hour and a half for the horses to take me over another glacier-stream which here joined the river. The horses arrived at ten o'clock, having found and enjoyed a good feed on the way, and half an hour later we got to another gorge, at the beginning of which (5310 feet) we established our camp 5.

With Ralph I started at 12.40 P. M. to see whether it would be possible to take the horses along the right bank of the gorge. At 2.30 we got to an open place, where horse-feed would have permitted to camp for a night. From here to the southwest another very fine waterfall was visible, — a twin fall of considerable height: two glacier-streams approach close to each other, and, going down separately over a perpendicular precipice, unite at its foot. Here we turned to the northeast, and stood at 3.10 beyond the gorge (5770 feet), on the high bank of the river, overlooking its opposite bank and part of the glacier, from which the former originates. We returned from here to our camp, keeping close to river and gorge, and arrived there at 5.45, convinced that it would be very difficult to get our horses further up on this side. So we decided to try the other side of the river, and left at ten o'clock next morning. Starting ahead of the horses, I climbed a little too high. Travelling closer to gorge and river, they passed me, and at 12.30 P. M. I found camp 6 (5650 feet) already established on a small elevation close to the stream, and in view of the beautiful glacier which, as source of the North Fork of the Wapta, may fitly be called "Wapta Glacier." The river emerges from a fine ice cave, at the foot of which (5680 feet) I determined the boiling point[1] of the water to be 95.545° C. = 623.43 mm. = 24.545 inches.

After a very cold night, during which the thermometer, moistened by heavy dew, went down to freezing point, we started at 7.30 A. M., ascended the tongue of the glacier, and crossed over to its right bank. At 9.30 we passed the entrance to a western side valley, marked by a green island with some trees on it, and reached at 10.30 the highest point of the lateral moraine (7670 feet). From here we descended a few feet down to the glacier, which we soon found covered with soft snow, obliging us to take the rope. We were now on the great ice-field, which in this part of the Rockies is said to stretch far to the north, and in this direction perpendicular ridges of rock, several hundred feet in height, emerge from the same. We turned to the western part of the basin, which perhaps sends down another valley glacier (292°), towards the so-called North Branch of the Kicking Horse River, and halted there at 1.15 P. M. (8840 feet), lunching, observing, photographing. Fine, glacier-clad mountains stood near to us, two to the south (164° and 207°), one to the northwest (308½°), united to a rocky wall; and to the east stretched the three peaks which border the left bank of the Wapta Glacier, the highest (100°) more to the north, the eastern part of the great glacier basin descending between them into the main stream. To the southeast the chain of the Rockies south of the Kicking Horse River was visible: the Ottertail peaks of Mt. Goodsir (141¼°–140°), Mt. Stephen (134°), Cathedral, Biddle, Hungabee, Huber, Victoria, and Lefroy, a most wonderful view, which reminded me of the Dolomites in the Alps. At 3.30 we retraced our steps, reaching camp at 6.45 P. M.

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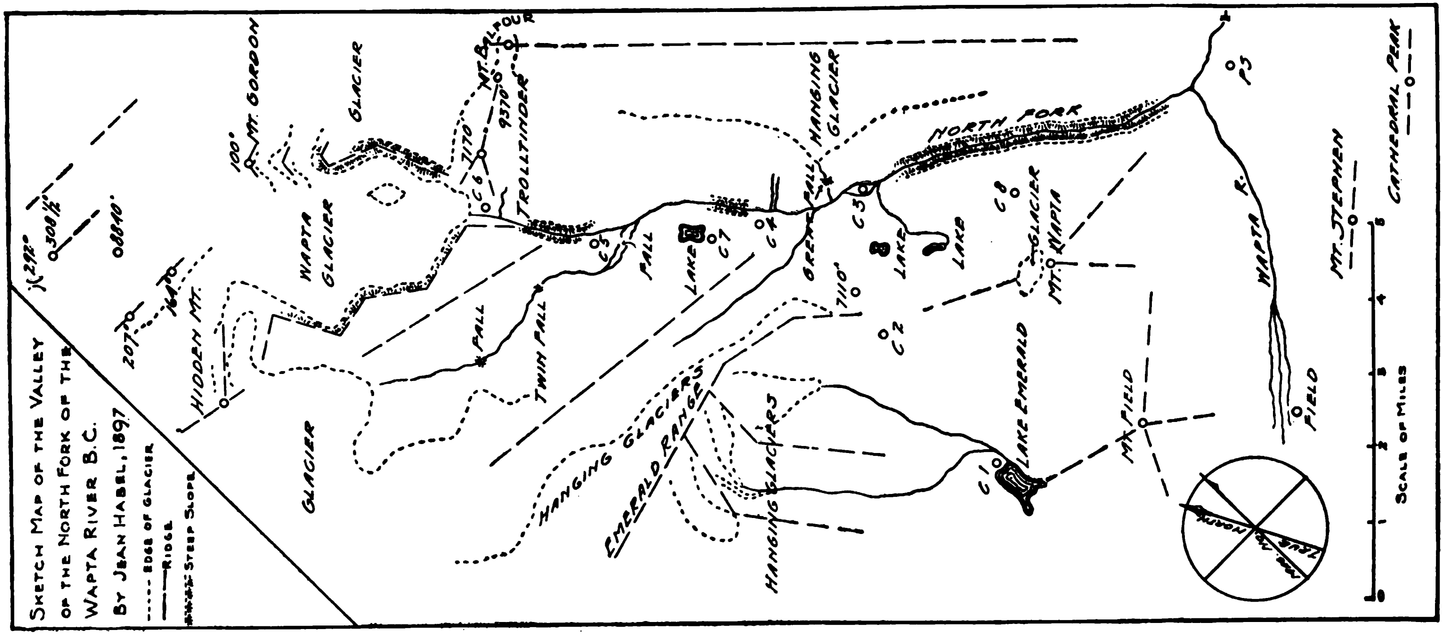
[1] July 25, four P. M. Temperature of the air, 8° C. (46.4° F.).

The next day was spent in the environs of our camp, and on the 28th the eastern slope of the valley was ascended. A steep climb of an hour and a half brought us to a point (7170 ft.) where the whole western side of the North Fork Valley was visible, including Hidden Mountain. The ascent to the latter would perhaps be easily achieved through the side valley, the entrance of which we passed on our way to the glacier basin. This mountain and its glacier-clad neighbors is drained by the stream which forms the above-mentioned Twin Fall and the little picturesque fall we passed before camp 5. We had a very fine view of the former from here, and above it part of another fall formed by the same torrent was visible. To the south of this "Waterfall Valley" the whole northern side of Emerald Range, Mt. Wapta, and the Mt. Stephen group were visible. To the east, not far from us, stood the perpendicular walls of Mt. Balfour and, separated from it by a small glacier, a characteristic mountain, to all appearance quite inaccessible from this side, resembling somewhat a well known mountain in the Norwegian valley of Romsdalen, and which I therefore called "Trolltinder." Ascending further east, we got in two hours to the highest point (9370 feet) of the ridge which here borders the southern part of the great glacier basin at the foot of Mt. Balfour. The weather, in the morning cloudy and rainy, had cleared up, and we could even see, to the right of the Ottertails, something of the distant Selkirk Range. A descent of two hours brought us back to the camp. The evening was a most glorious one. At sunset Mt. Stephen appeared from



Wm. H. Punchard, Tremont Bld'g.
Boston.

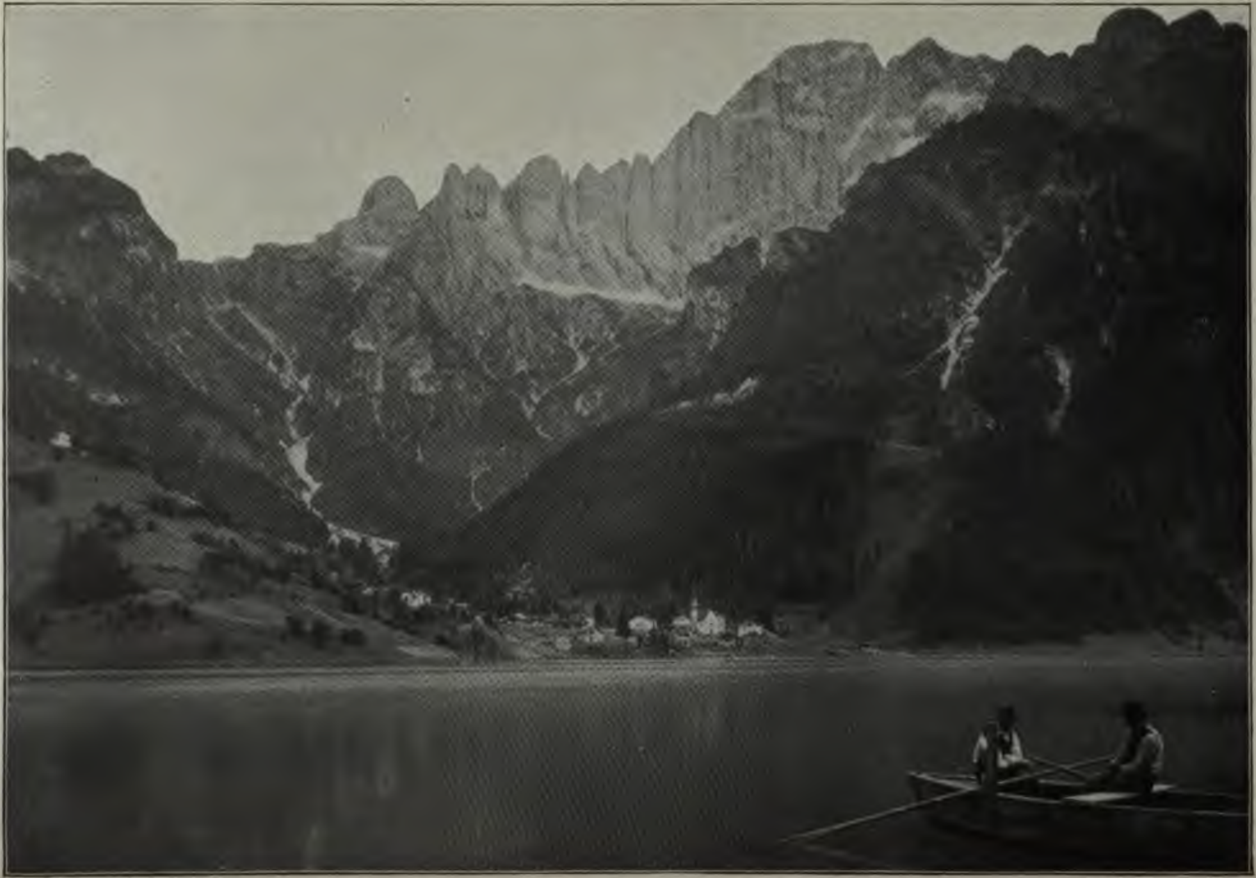
MAP OF VALLEY OF NORTH FORK OF THE WAPTA.

foot to top clad in a bright purple, and the weather promised to be fair next day.

But we, and still more our horses, began to run short of provisions; for them scarcely anything was left in the neighborhood of the camp to live upon. They always kept close to the latter, begging for salt and perhaps something more, which we were unable to provide. So we decided to turn back and to leave the place on the morning of July 29. I started at seven o'clock, and in fifteen minutes reached the beginning of the gorge, the right bank of which I followed as closely as possible, enjoying the fine views into it. At nine I found myself opposite our camp 5 (5310 feet), where I had to wait for the horses to take me over the river, which they did two hours later. Fifteen minutes further on, we crossed the two glacier streams coming from the west, one of them with the picturesque fall. Then we kept more to the right to a little lake, where Fred, on our way up, had discovered excellent feed, and where we arrived at 11.40 A. M. (5270 feet). We unpacked the horses here, and rested north of the little swampy plain leading to the lake. At 2.30 P. M. I walked around its rocky western shore and, measuring the temperature of its water, found it to be 66.2° F. No doubt that, as it lies at a height of 5270 feet above sea-level, where even in July the thermometer during night-time often goes down nearly to freezing point, this small and shallow sheet of water must be fed by warm springs. Water-plants were growing on its muddy bottom, on which was strewn much rubbish, amongst it the lower jaw of a caribou. The water was full of animal life, as beetles, snails, and an animal in shape and size similar to a sea-horse or a large branchipus, which I was unable to catch. Numerous water-creepers were rushing about on the quiet surface of the lake. Arriving at the southern end I found the situation so inviting, a rich vegetation and a fine view towards the Wapta Glacier, that, in the interest of man and beast, I resolved to camp here for the night. The day had been a very fine one, and we enjoyed a cloudless evening.

Starting at 7.45 next morning, we remained on the right bank of the river, without crossing to the left and back again, as we did on our way up. Over pretty even ground, only once being obliged to climb a steeper slope, we reached, at 9.30, our camp 3 (4930 feet). Shortly below this camp the river descends through another gorge, and, as far as I could ascertain, it would be impossible to follow closely along the right bank from here to the confluence with the left fork of the Wapta. We turned a little to the west, and with many ups and downs, over most difficult ground, through a labyrinth of fallen timber, we worked our way to an open space, cleared by the avalanches from the slopes of Mt. Wapta. At noon we established here our last camp 8 (5100 feet). There was no water in the neighborhood of this camp, and we had to melt for our teapot the snow of an avalanche, still resting here close by. Our horses had likewise to apply to the frozen element; they were used to it, being accustomed to quench their thirst on the plains east of the Rockies, during winter-time, by licking snow. At four P. M. a thunderstorm swept over Mt. Stephen and Mt. Cathedral, which were in full view from our camp and presented a most striking appearance with the heavily loaded clouds hovering above and behind them. At five o'clock the storm came down upon our camp in full force, the rain nearly penetrating the tent. There was another shower at seven o'clock. Then the evening was quiet. My men, the jolly triplet, as a "good-by" to the mountains for this time, built a fire as big as I ever saw at this height above sea-level.

It was raining again next morning, but we were able to start at half past eight. First descending, we passed a swampy plain, and then climbed through dense shrubbery in two hours and a half to the pass (5420 feet) west of a little wooded mountain and seen from the railway. The descent from this pass and the ascent from Emerald Lake to camp 2 were perhaps the most difficult parts of the road traversed by our animals on this journey. But all the difficulties which rocky inclines and fallen timber opposed to them were most skilfully conquered. At 1.40 P. M. we found ourselves on the left bank of the Wapta, at the foot of Mt. Stephen. An hour's walk brought me back to Field.



MONTE CIVETTA.

Reminiscences of Tyrol.

By Edwin Swift Balch.

Read January 19, 1898.

To the mountaineer, to the geologist, and to the artist alike, the Eastern Alps present two distinct districts: the snow-clad Alps in the north and the dolomite rock peaks in the south. To the ethnologist and the historian these geographical features of the country correspond closely with its ethnological and political features, for the northern portions are inhabited by a fairer-haired, large German people, and the southern portions by a darker-haired, small Italian race. The Germans have graphic names for these two districts: Deutsch-Tyrol, and Welsch-Tyrol, or Tyrol of the strangers. No absolute boundaries, however, can be drawn, as neither geologically nor ethnologically is there a sharp separating line. Thus the district of the snowy ranges of the Adamello and the Presanella, and the rock peaks of Cortina and Campitello are ethnologically Italian, but politically the first are Italian and the last Austrian. Still in the main the dividing line follows the water-sheds; and the northern slope, with the snow peaks, is Austrian, while the southern slope, with the rock peaks, is Italian.

From the geographer's standpoint the Eastern Alps may be divided into something like a dozen main groups of mountains, separated by great valleys. From north to south the great division is the Brenner valley, the oldest of Alpine passes, as it is the direct artery between Northeastern Italy and Southern Germany. From east to west the mountains are divided by the great valleys of the Inn and the Pinzgau, and by those of the Vintschgau and the Pusterthal.

With the exception of a little strip belonging to Bavaria in the extreme north, the German-speaking portion of the Eastern Alps is Austrian, and is the part of the world usually called in English "The Tirrel," although its name is "Tyrol;" and no one knows why the article is tacked on, nor why the name is mispronounced. English climbers sometimes call Tyrol "the k. k. country," from the use of the initials "k. k." in all the various departments of the government of the *kaiserlich-königlich* lands of Austria-Hungary.

It is rather strange that Americans travel so little in Tyrol, but it is of course because most of those who go over to Europe are occupied in seeing the cities; and also because the mountains of the Eastern Alps are somewhat overshadowed by their taller western neighbors. Few Americans also care to travel in the fashion best suited to see Tyrol, namely, on foot; but for any one who likes walking, Tyrol is admirable ground, and there is no better way of spending a few weeks than tramping about it with one or two friends.

Every one nowadays knows the proper outfit for walking tours, so it is unnecessary to speak of that; but every one does not know how best to carry a pack, and it may be safely said that there is only one comfortable plan, and that is to hire a porter to carry it for you: it then becomes much less heavy and troublesome. While on the subject of packs, it may be well to recall the fact that the rücksack is a Tyrolese invention dating back several centuries. Its age is proved by one of the wood-cuts of Albrecht Dürer, representing a chamois hunter with his quarry in a rücksack.

Inns are still primitive in out-of-the-way places. In the larger centres the modern hotel is creeping in with table d'hôte and waiters in dress suits; but in general tourists' accommodations are meagre. Still, if one is not too particular, and especially if one is not over dainty as to one's fare, the inns are endurable. Veal, in several forms, roast and fried, is about the only meat, and the Tyrolese universally make — in several different forms — a very palatable dish, called *mehlspeise*, out of eggs, milk, flour, and sugar. It tastes something like a sweet omelette or a French *crêpe.* A new style of hotel has sprung up within the last fifteen years in the shape of the club huts. Many of these are *bewirthschaftet*, which means that there is some one there who will give you hot meals. These huts are always placed at high altitudes, in such a position that several peaks can be ascended from the same hut, and an easy way of seeing a district is to make the different ascents without descending to the valley. With all their faults, both inns and huts have one redeeming quality: they are cheap.

Despite the poor diet of the people, the Tyrolese are generally fine, stalwart men, on whom one can rely. I have always found them good-natured and easy to get along with. When you meet them they invariably have a salutation for you, the words *Grüss Gott* showing the religious turn of mind of the people, of which the Passion Plays of Ober-Ammergau and Brixlegg are an outcome.

Along these northern slopes are numerous lakes, of which the Königssee is the most famous. They are very beautiful, with clear green waters and mountain surroundings; and at most of them there is a greater sense of isolation than at the Swiss lakes.

On one trip, I walked from Bludenz via Paznaun and Samnaun to the Inn valley. All this country is extremely unspoilt as yet and costumes are still to be seen. We had a great many trout and much chamois at our meals. Chamois is not at all bad eating; it is something like venison. Our old guide, Franz Pöhl, who had served in the war of 1848, and had fought at the battle of Novara, led us by a little pass called the Zebles Joch from the Paznaunerthal into Samnaun, one of the lateral valleys of the Inn. A horseshoe of mountains, with peaks of over three thousand metres in height, completely surrounds it on all sides, with only one break at its lower end, where the waters find their natural outlet to the river Inn. Through this gap runs the only bridle-path in Samnaun, as every other entrance is over a mountain pass, and it is a curious political freak that the valley itself is Swiss, while its natural geographical outlet is into Austria.

I do not suppose it is possible to find a more utterly sequestered spot in Europe than this Samnaunthal. The inhabitants are almost cut off from intercourse with the outside world, and any one in need of quiet can find plenty and to spare in Samnaun. It is chiefly pasture land in the upper reaches, with some timber lower down, and with a few houses dotted here and there. When we arrived at Compatsch, the one collection of huts, and applied at the peasants' inn for some food, I think we were looked on with a good deal of curiosity, for travellers into Samnaun are few and far between.

The exit from Samnaun leads straight into the superb cañon of the Finstermünz, — second in the Alps to the Via Mala only, — with tremendous rocks, sombre in tone and with a splendid road cut into them. Nature is not improved, however, by the presence of a painted iron chamois on a rock overhanging the road. At this spot the cliffs are several hundred metres in height, and the Inn, which has forced its way through, roars below in the gorge.[1]

To the south of the Inn lies a district visited but by few English-speaking travellers. This is the range of mountains clustering around the Oetzthal, and known as the Oetzthaler Alpen, and why it is so neglected is a puzzle. The fine peaks and passes of the district are numberless, and the glaciers very large. One of them, the Gepatsch, is the sixth largest glacier in the whole of the Alps, and the longest in the Eastern Alps, being over eleven kilometres in length.

There is no better place than the glaciers of the Oetzthal for practising ice and snow walking, and learning how not to fall into crevasses. I can speak from experience, having crossed seven glacier passes in the range in 1880 and 1882 in the company of an ex-editor of the "Alpine Journal," Mr. Arthur J. Butler. We had the two most famous guides of Tyrol with us, the Spechtenhausers, whose name came from that of their old homestead, Hof Spechtenhaus, — a Tyrolese custom, I believe.

Three of these passes would be considered first class in any part of Switzerland. These are the Langtauferers Joch, from Hinterkirch to Kurzras; the Gepatsch Joch, from Vent to the Gepatsch Haus in the Kaunzerthal, and the Rothmoos Joch, from Ober Gurgl to the Pfelderthal. On the Gepatsch Joch there is one particularly nasty place, the *sumpf*, or swamp, so called from its being a perfect network of crevasses, and while crossing this in a hurry, as we were caught in a heavy storm, I tumbled completely through a snow bridge and found myself hanging free in space on the rope, from which unpleasant position I was rescued by dint of hauling.

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[1] There is a story — which will bear translation — illustrating the admiration of the Tyrolese for their river Inn. One of the great characteristics of the people is their intense patriotism. A young Tyrolese who had gone to one of the German universities attended the lectures on Natural History. One day the professor began his lecture: "The instinct" — but before he could continue he was interrupted by the Tyrolese student in a rage: "No, sir, the Inn does not stink."

Of the value of the rope on glaciers, I had another illustration while crossing the Hoch Joch in the Oetzthal with Dr. Porges, of Vienna, who made the first ascent of the Mönch at Grindelwald in 1857. Against my wishes, we crossed the Joch without a rope, partly because it seemed difficult to get one, and partly because Dr. Porges thought one unnecessary. To my delight, I must say, hardly had he got on to the ice before he sank into a crevasse nearly to his waist, and had some difficulty in getting out.

At Vent and Gurgl we stopped at the parsonages — there were no inns in early days — and paid for our entertainment. Both the "Herr Curats" were nice men, with decided mountaineering proclivities; and on my asking the one at Vent for a guide to ascend the Wildspitz, he at once recommended one, adding: "I will come myself as your second guide; I have been up fifteen times already." At Vent, also, I had an illustration of how to travel easily and to save trouble in making an early start. Three of us tourists had to sleep in the same room, and one of the party, a German, who had ordered his breakfast at five o'clock, and was called at the same hour, was ready on time because all his toilet consisted in taking off and putting on his boots.

From Gurgl, the Rothmoos Joch leads to the Passaierthal via the Pfelderthal. The Rothmoos is a fine pass over snow field and glacier, and with a glacier hanging over and discharging on to it at one place, to which the traveller must give a wide berth. So little used is the pass that our guides led us to the wrong gap, and we found ourselves looking down an almost vertical precipice, and had to make a long detour to find the right col. In the Passaierthal is Am Sand, the now almost deserted inn of Andreas Hofer, the national hero of Tyrol.

At Unser Lieben Frau in the Schnalserthal, on the southern slopes of the Oetzthal, I saw one Sunday all the peasants, both men and women, turn out for church in their national costumes, and very quaint they were. The men had black chamois leather knee-breeches, white footless stockings, brown jackets with pleats in the back, and wonderfully adorned hats; and most of them had broad leather belts with quill workings and green suspenders. The women were encased in a sort of perfectly straight bodice, with black and brown petticoats spreading out all around at the hips, and then falling straight in pleats: about the ugliest dress I ever saw, as everything like shape was destroyed. As soon as mass was over, some of the peasants turned their attention to rifle-shooting, and made many splendid shots. The target was an iron deer which was pushed through a little open space between two covers, and although it moved rapidly, it was repeatedly hit in the centre. Those who did not shoot, played skittles and drank beer.

It is a decided rarity to see such gatherings nowadays, and it only happens in very out-of-the-way places, as, thanks to the inroads of commerce and tourists, the old national dress is rapidly disappearing. Only two garments seem likely to hold their own. One is the *jacke*, a double-breasted sack coat of a beautiful and almost waterproof gray or brown homespun, something like Irish frieze, with green facings and a standing collar. The other is the *wettermantel*, a cloak made of *loden*, a kind of homespun which is practically shower-proof.

South of the Oetzthaler Alpen, across the valley of the Vintschgau, lies the great massif, whose culminating point, the Ortler, 3902 metres, is the highest peak in the Eastern Alps. Almost every one who travels in the vicinity will cross the Stelvio Pass, the highest and possibly the finest carriage pass in the Alps. The view of the Ortler from the pass is certainly grand, and the Stilfser Joch is certainly one of the two great passes of Tyrol, the Ampezzo road in the Dolomites being the other.

To any able-bodied tourist I would strongly recommend the ascent of the Ortler. It is not difficult, and I have never made any excursion which was more thoroughly *lohnend*. I ascended it from Trafoi, in August, 1880, stopping over night at the Payerhut.[1]

At the Payerhut there was one ground-floor room for the "Herrschaften," and one attic room for the guides. In our apartment, which was parlor, dining-room, kitchen, and bed-

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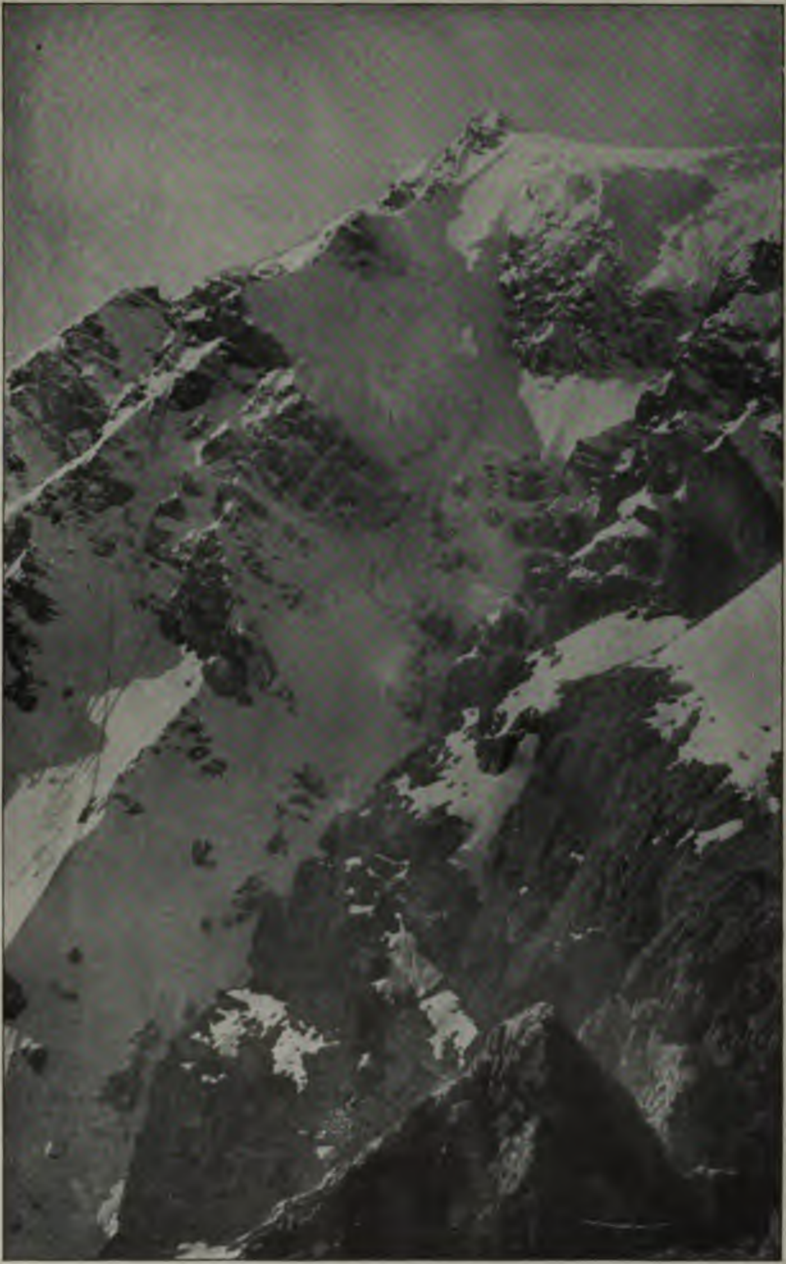
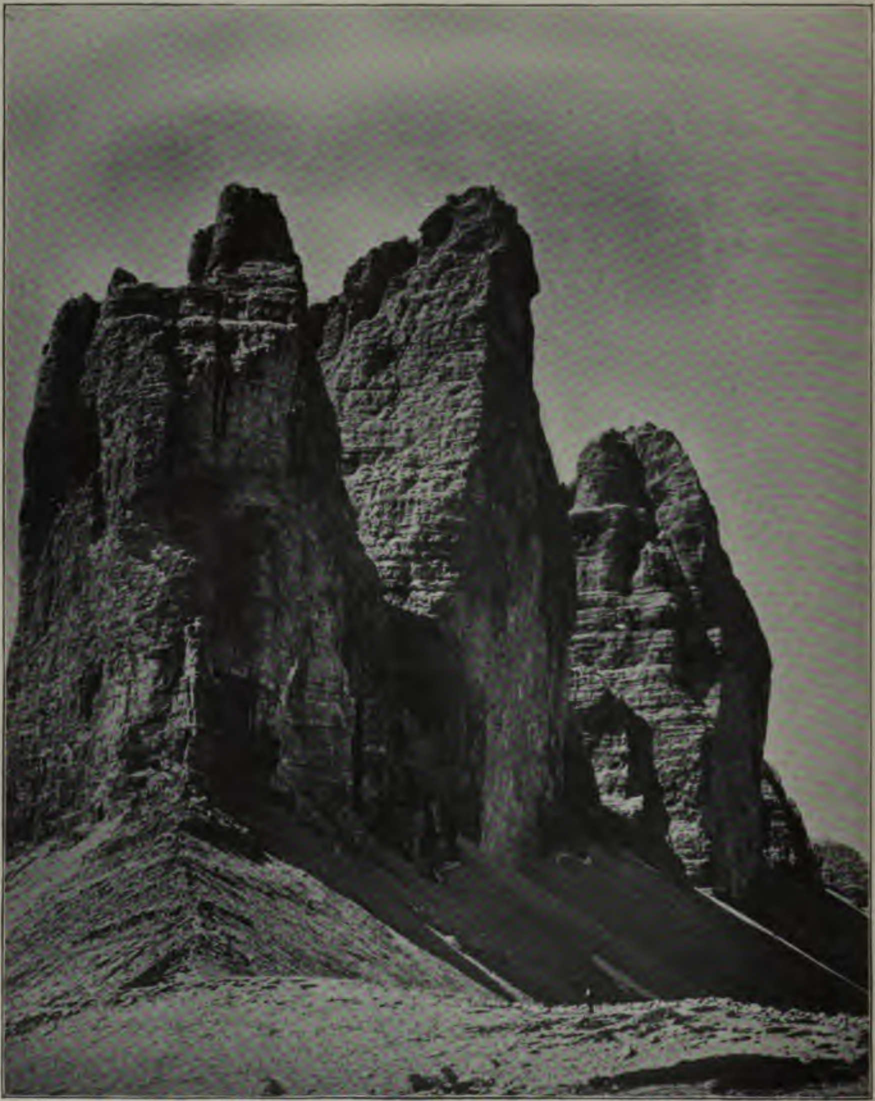
[1] This is named after Lieutenant Julius Payer, who was one of the first explorers of the Ortler and the Adamello Alps; and who afterwards, with Carl Weyprecht, in the *Admiral Tegethoff*, discovered Franz Josef's Land. The other great explorer of the Ortler group, and indeed of all Tyrol, was Mr. F. F. Tuckett, of whom they used to say when a very difficult peak was unascended: "It can be done only by *dem Tuckett oder dem Teufel*."



THE ORTLER.



THE DREI ZINNEN.

room in one, there was a stove over which our guides made a hot mess of flour and water which passed for soup. There was also one bunk, on which, side by side, seven of us tourists lay down and did not sleep. It was too cold, although we had put on everything we had, except our spectacles. One old gentleman did manage to drop off occasionally, but, as he immediately let us know, he was promptly awakened by the noisy imitations the rest of the party thought fit to indulge in.

After an early bite of cold veal we left the hut on an absolutely perfect morning at four o'clock. First passing a snow field, we then skirted the base of some cliffs for twenty minutes; here the guides said that stones sometimes fell, and that it was a little dangerous. After this the rest of the climb was either over snow-covered glacier with an occasional crevasse, or up snow slopes generally at a moderate angle, but in one or two places stiffening into a steep slope, and needing good big footsteps and handholes; however, as the snow was frozen hard at that early hour, there was neither difficulty nor danger. The summit, which we reached at half past seven o'clock, is a long, pure snow ridge, with the most beautiful view imaginable. We stayed a couple of hours on top, breakfasting and taking in the glorious panorama. My guide was a fine reliable fellow, Johann Mazagg by name. He made one remark that struck me as wonderfully true: "I like to be on a mountain; one has no evil thoughts there." His pay was only ten gulden, about five dollars; so that with the provisions, the whole excursion did not cost over eight dollars. Baedeker, I think, rather exaggerates the difficulties, presumably because he wants to be on the safe side. However, there has been one accident on the upper slopes by one of the party slipping, and though nobody was killed, all were pretty badly hurt.

East of the Brenner, and north of the Pusterthal, is an immense district containing some of the most picturesque scenery in Europe. The Salzkammergut, Zell am See, Eisenerz, and the Glockner and Venediger are some of the chief points, and costumes are still occasionally seen. In an ascent of the Venediger which my brother and I made in 1894, our guides were in full Tyrolese dress with black chamois knee-breeches and green stockings.

In the Salzkammergut country, many years ago, I witnessed an occurrence of more than ordinary interest, and one which tourists seldom see, as it happens before their advent in summer. This was the bringing down to the valley of the wood cut during the winter, by a method which seems to be *sui generis.* The forests are better managed in Austria than with us, and in the Salzkammergut the districts of the forests are cut in rotation about once in every twenty years. The wood is brought to some creek high up in the mountains, and when the cutting is all done, the creek is dammed up until a small lake is formed into which all the logs are gathered; the dam is then cut and the rush of water brings the wood in a kind of tremendous slide far down into the valley. A horseback ride of some four hours from Ischl up a mountain gorge brought us to a spot opposite a great precipitous rock slope over which a small stream flowed in a slender waterfall. Many Tyrolese, some in their picturesque native dress, were already gathered there. Suddenly we heard a dull roar in the opposite rocks overhead. Immediately the waterfall swelled in volume, then a great log shot out violently in the air and with a huge bound struck into the rocks below. Then came more logs and more water, increasing in number and volume until there was a Niagara of dun-colored water and great logs hurtling through the air and pouring over the cliffs in a roaring avalanche for some ten minutes, and tearing madly down the stream below us.

The strangest mountain formations of the Eastern Alps are the Dolomites, which form the Southern Alps, and offer a rich and varied field. They are magnesian limestone mountains, and are named after the first geologist who examined them, the Frenchman Dolomieu. I believe that there is not much doubt that they are old coral reefs, and that the coral atolls of the Pacific are dolomites in course of formation. They rise in general as separate masses, to heights varying between about 2800 to 3300 metres. Different in formation, appearance, and color from all other European mountains, they assume all sorts of fantastic shapes, as towers or needles or serrated walls of rock. The local color of these gaunt, bare rock skeletons is a reddish or yellowish gray or brown, the reds and yellows being exceedingly pronounced. At sunrise or sunset the tints are gorgeous, — brilliant golds and fiery reds. There is a depth of color not found elsewhere, as the color of the rock itself meets the sunset hues half way. Strange and weird as are the forms of the ragged pinnacles, yet the color note of the Dolomites is perhaps their most unique feature.

It was on a July morning in the year 1880, that, in company with Mr. Charles C. Binney, of Philadelphia, I made my first acquaintance with the Dolomites. Starting from Toblach, we walked down the Ampezzo valley to Cortina. As we passed Höhlenstein, the Drei Zinnen suddenly came into view, and the first glimpse of those pointed spires rising straight up for hundreds of metres made me an ardent Dolomite enthusiast. Every step of the road was interesting, disclosing lovely views; and I felt it was a country whose closer acquaintance would repay a lover of the mountains. Since then I have stayed at Höhlenstein and Schluderbach, and have many pleasant reminiscences. At Höhlenstein I was lucky enough to stop once on the birthday of the Emperor of Austria. The natives celebrated it by firing rifles all day long, and in the evening after dark by lighting huge beacon fires on the surrounding summits, making the weirdest effect among the wild dolomite crags. Höhlenstein is the best place to see sunset on the Drei Zinnen, and in the morning light the towers of Monte Cristallo across the Dürrensee are exceedingly grand.

Cortina is a beautiful spot. The Ampezzo valley here spreads out wide in grassy meadows and gentle slopes to the base of the great dolomite peaks which rise all around it: yellow Tofana, Cristallo, and Pomogognon; massive Sorapiss; slender gray Antelao; and shattered Croda di Formin. At Cortina several days can be pleasantly spent. The hotels are fairly good; they are no longer inns, and you are pretty sure to meet some agreeable people at the Aquila Nera. But the natives, judging by an incident which happened to me, live in a state of terrible poverty. I chanced one day to go into one of the small inns. The landlady was frying some queer little balls of a mushy-looking stuff in the kitchen. I asked what it was. "Polenta," I was told. "Is that all you have for dinner?" "Yes." "Well, what do you have for supper?" "Polenta." "And for breakfast?" "Polenta." "Is that every day?" "Yes, all the year round."

While at Cortina, a walk to the pass of Tre Croci should be taken. A two days' excursion can also be made down the Ampezzo and back again past Saint Vito and round the base of Antelao to Pieve di Cadore, the birthplace of Titian, in the background of whose pictures are sometimes found reminiscences of his native mountains. An ascent of Nuvolau is imperative. It is considered a splendid view point; only beware of getting to the top in a cloud, as happened to me. The road to Nuvolau passes close to the foot of Cinque Torri, one of the smaller and most extraordinary of all the Dolomites. It looks like a mediæval castle on a tremendous scale, with a keep in the shape of a rock a hundred metres in height and on three sides either vertical or absolutely overhanging. There is also on this road a splendid view of the Croda di Formin, perhaps the most perpendicular and pinnacly of all the Dolomites, with a ridge about as jagged as the teeth in a shark's jaw.

On my first excursion I went from Cortina to Caprile, and thence south to Agordo, a little Italian town, and from there in seven hours by a bridle-path over the Ceredo Pass, a most interesting walk, to Primiero. At a hovel on top of the pass we found some eggs, but no one who seemed able to cook them; so my knowledge of scrambling eggs stood us in good stead, as it has on many occasions where eggs were procurable and the natives did not know what to do with them.[1]

Primiero is another little tumble-down Italian village, with a bad little inn; but it is imperative to spend a night there, and visit the Val di Canali and the Val Pradidali. Their entrance is guarded by an old feudal ruin, Castel la Pietra. The rock on which it is built has split, and has fallen away on the formerly accessible side, so that to-day the castle cannot be reached. In Val Pradidali you are entirely surrounded by great Dolomites, the most wonderful of which are the towers of the Saas Maor, which means literally the Great Rock. No one should miss this excursion to the Val di Canali: there is only one habitation, and you are completely in the heart of primæval nature.

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[1] At the hotel in the large town of Bridgewater in Somerset, by the way, I once asked for scrambled eggs, and the servant, after inquiring, told me that they did not make such fancy dishes.

If I could but see one place in the Dolomites, it would certainly be San Martino. The range of the Cimon della Pala, the Pala di San Martina, and the Saas Maor are directly opposite, and you are among the steepest and most fantastic rock pinnacles in the world. At sunset the view is superb, as the peaks glow with the deep red dolomite gold. The ascent of some of these peaks is exceedingly difficult; "*lebensgefährlich*," was the epithet the first climber of the Pala applied to it, on my asking him about it.

Caprile is a place no traveller should miss, for the view of Monte Civetta from Caprile, or better still, from some hillside above Caprile, is splendid. Not sharp like the Zinnen, and unlike the San Martino Dolomites, Monte Civetta rises on the Caprile side as a solitary, precipitous mass, and the magnificence of this wall of rock, all broken at the top into jagged teeth, is unique. So grand did it seem to me when first I saw it that I immediately set my heart on the ascent; so on my next visit to the Dolomites in 1882, I engaged the excellent guide Alessandro Lacedelli of Cortina and went to a little place called Pecol di Zoldo, on the eastern side of Monte Civetta, and climbed it from there.

Pecol di Zoldo boasts of an inn, and such an inn! Perhaps they have improved it since; but at that time, and with much experience of bad inns, I think I may safely say that the one at Pecol was the *ne plus ultra* of badness. The only room that was even tolerable was that of the landlord, who kindly gave it up to me; but it was impossible to get any sleep there. The chicken we had for dinner was hopping around when we arrived, but the landlord promptly put an end to its term of life, and by judicious boiling it furnished us with both soup and meat.

We were off from Pecol sometime after four o'clock in the morning, and a rough scramble of some five hours and a half landed us on the summit of Civetta about ten. The view from Civetta is less impressive than the view of Civetta. It is impossible to look down the great precipice, owing to the danger of going too near the edge, and we had to be satisfied with the view of the wild Dolomites, which make up the panorama. The great square castle of Monte Pelmo, a most imposing mountain, is the finest single object. On our descent of Civetta, a thunderstorm came across from Monte Pelmo, the hail poured down fiercely, and the red flashes of lightning played around us, while we took refuge under an overhanging rock to let the storm pass.

If any one has a spare day at Caprile, it is well worth climbing up the slopes to the northwest to see the most extraordinary little dolomite, whose name, I believe, is the Sasso di Ronch. It is a thin, flat wedge, and seen endwise shows about the same relations of width to height as a paper-cutter set on edge. Mr. Binney and I tried to climb it without either guide, rope, or nails in our boots, and we were inevitably doomed to failure. By one pushing the other up, and being in turn hauled up in some places, we got about half way to the top, when discretion overcame valor and we retired.

I was so much impressed with the perpendicularity of the Drei Zinnen the first time I walked down the Ampezzo that there was no resisting the desire to try a closer acquaintance with them, and so on a second visit I stopped at Schluderbach for the purpose, and one fine August morning in the year 1882 started for the ascent with the well-known guide, Michel Innerkofler. He was a short, broad-shouldered man, with a handsome, pleasant face and a long, brown beard. Sad to say, he was shortly afterwards killed on Monte Cristallo, by the breaking of a snow bridge. We left Schluderbach about five o'clock in the morning and walked up the Val Popena towards the Zinnen, with the morning sun illuminating the peaks of Monte Cristallo and the Cadin Spitzen with the glorious pink and golden tints which are not to be seen outside of the Dolomites. Our track was at first a path over grass slopes, then as we rounded the Zinnen we got on to *geröll*, that is, loose rubble rocks that have been torn off from the peaks, and that lie in heaps at their bases. To me this is the most disagreeable part of mountain walking, and fraught with the continuous terror of breaking a leg in jumping from rock to rock.

When we reached the base of the mountain, from walking the mode of procedure changed completely. Innerkofler tied one end of a fifteen-metre rope around his waist and the other end around mine. He would climb up to the full length of the rope, fasten himself on some projecting rock where he was secure, and as I followed, gingerly haul in the rope, keeping it taut in case of a slip, but not pulling on it at all, so as to let my movements be perfectly free. The architecture of the Zinnen is so much on the perpendicular that the climbing is of the greatest interest. We went nearly straight up along the great yellow face of rock, which may without exaggeration almost be called a precipice. There was one chimney which we had to ascend by hanging on by our hands and pulling ourselves up over a great rock which had wedged in the centre. A little above this chimney we came to a place where I had something like the sensation of dizziness. We climbed up a rock wall that must have been sixty-five degrees at least in steepness. When we reached the top I found that we were on an arête about ten metres long and less than one metre broad, with the slope we had just come up on one side, and on the other what looked like a perfectly sheer wall to the base of the mountain. I crossed the ridge on all fours, which Innerkofler told me was the regular method, and a further short climb landed us on top of the highest peak of the Drei Zinnen.

The view gave me the most extraordinary sensation. I felt as if I were on one of the towers of some monster Gothic cathedral, a hundredfold greater than any ever made by man, and with the additional interest that having come up on the outside of the tower, I had to return by the same way. As we sat on the top we heard *jauchzers* come floating up to us from below, which meant that our ascent had been watched and that we were being envied and admired. My guide promptly returned the salute by firing off also a number of *jauchzers*, — wild, unearthly yells in a high falsetto key, which are the regular means of conversation among the high Alps. They sound extremely easy to make, but if you try to give one yourself, you find it impossible to produce one anything like the original. Going down the Zinnen was very much like going up, except that my guide sat on some ledge and paid out the rope, while I descended, and then, while I remained fixed, he descended to me in turn.

In bringing to an end these reminiscences of a mountain land where I have had so many pleasant jaunts, I do so with the certainty that any of my Appalachian brethren who may go there will not be disappointed. They will find Tyrol full of the most picturesque scenery and the Tyrolese a simple, honest people, as yet unspoilt by too much contact with passing strangers. And may I close with the wish that as the Tyrolese have been, so may they continue, and bid Tyrol farewell in the words of Andreas Hofer: "*Leb'wohl, mein Land Tyrol.*"

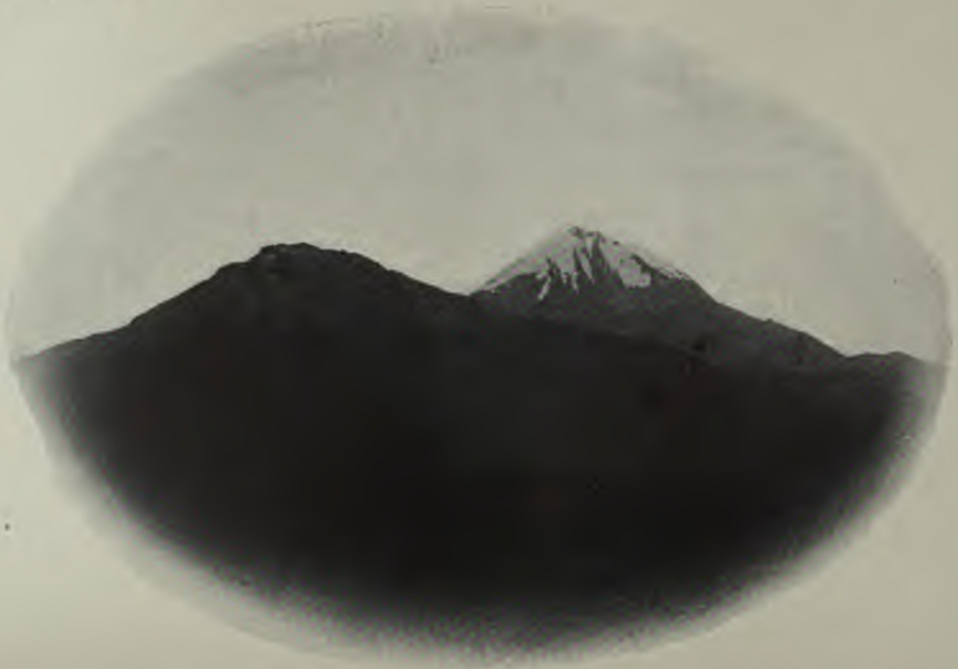
A Trip to the Summit of Orizaba.

By W. A. Cogshall.

Read October 20, 1897.

The peak of Orizaba, known to the ancient inhabitants of Mexico as Citlaltepetl, is one of three high mountains on the southeastern edge of the valley of Mexico, which form the most conspicuous landmarks for many miles around. Looking south and east from the city of Mexico, one may see the great volcano Popocatepetl, forty miles away, with its smooth regular cone, capped with snow the year round and on clear days standing out against the blue sky as distinctly as though it were but a few miles distant at the most. Farther to the east and at about the same distance stands Ixtaccihuatl, the "White Woman," so called because of the resemblance of its long, irregular, snow-capped crest to the form of one sleeping. Beyond these two and nearer the Gulf coast stands the highest and most imposing of the three, just at the point where the railroad leaves the high tableland of Mexico, and descends into the low, tropical country of the coast.

Many travellers in Mexico make it a point to ascend Popocatepetl, and it is a trip well worth taking; but fewer have attempted to climb the higher and more difficult peak of Orizaba. It was, therefore, after having made the easier ascent of the former that we set out from the city of Mexico with both mercurial and aneroid barometers, thermometers, etc., to determine the height of the greater volcano. We left the city on April 27 at seven A. M., by the Mexican and Vera Cruz railroad,



ORIZABA.

passing along the shore of the once great lake Texcoco, and through several small towns. About twenty-five miles from Mexico the road passes near some of the old Aztec ruins which are so abundant in some parts of that country. Near the modern town of San Juan Teotihuacan stand several pyramids of different sizes, built very regularly, and still showing plainly that they are the work of a race now passed out of existence. The two most conspicuous ones are the "Pyramid of the Sun" and the "Pyramid of the Moon." About them at one time existed a city of unknown size, and many interesting relics have been found near by.[1] At the small station near by are dozens of men and boys all trying to sell to unsuspecting travellers stone idols, jugs, arrowheads, and other articles which at first sight one might be inclined to believe genuine, and according to the earnest protestations of the venders, such they are.

Leaving behind this city of idols, we continue in a southeasterly direction through several well-known towns. Perhaps the most interesting of these is Apizaco, known to those who have passed through it as the "Cane Station," for apparently almost the whole population is engaged either in making canes or in selling them. Canes of all sizes, shapes, colors, designs, and prices; canes in long rows against the side of the station; canes by the armful being pushed into the car windows, and every vender trying his best to make you understand that he has the only canes worth buying, and that they are the cheapest ever heard of. They are cheap indeed. A small hand-carved stick can be had for five cents in Mexican money, or an elaborately carved coffee-wood cane of moderate size, or one that looks like the trunk of a young tree, all varying in price up to about a dollar.

After leaving this place, there is little of special interest till the station of San Andres is reached, at which point we leave the railroad. Here there is only the station, but by taking a street car drawn by four mules, we go a couple of miles back from the railroad to the town of San Andres Chalchicomula. This is a little city of about five thousand inhabitants, and surprisingly well kept and pretty for such an out-of-the-way place. There are a well-shaded public square or plaza, with a couple of fountains, two or three churches of spotless white with the round-topped towers seen so commonly in Mexico, a very good restaurant (also a very poor one), and several good-sized stores, beside the numerous small shops so common in most Mexican towns. From the roof of the little hotel may be seen the great volcano, with a smaller peak standing almost in front of it, looking very steep and rugged, and having altogether the appearance of a very hard climb, — which appearance is not at all deceptive.

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[1] Among these may be mentioned one of the largest idols or sacrificial stones now in the National Museum of Mexico. This stone was known and accurately described by the early historians, but by some chance it was lost sight of. Years afterward it was found that the great stone at San Juan had exactly the same dimensions as the lost one. When the half-buried mass was dug out and turned over, it was found to be the lost idol, turned face down. The larger of the two pyramids mentioned is two hundred and seventy feet high, and is about five hundred feet square at the base.

After dinner, served in a room of the hotel, we made some inquiries in regard to getting horses and guides, and about five o'clock that afternoon found that there were no horses to be had. Many of the native Indians, who know the mountain trails, were engaged in carrying down snow and ice, which is one of the chief occupations of the town. We were told that the natives will make a trip up to the snow line, and bring down a large load to be shipped to the cities of the hotter parts of the country, between four o'clock in the morning and dark, and go all the way on foot. Certain it is that they can do great feats of mountain climbing. We finally found that we could secure guides, and that they would do their best to get us mules if no horses could be found. Nothing more could be done till morning, so after one of the party (we will not say which one) had dropped two mercurial barometers on the floor and broken the tube of one and the attached thermometer of the other, we slept the sleep of mountain climbers with a big day ahead.

Next morning a half dozen Mexicans appeared with seven or eight little mules and one horse, but only one of these animals had a saddle. All the rest had on their backs the large thick cushions to which are fastened the packs they usually carry. These, we found, made very comfortable seats as long as the mules were peaceable, which they usually were.

Beside the mules for the four Americans in the party, there were two others to carry water, blankets, provisions, etc.; so we made quite a procession as we filed through the streets of San Andres about ten o'clock in the morning. It was slightly cloudy, and we had not been able to get a really good view of the distant peak. As the morning went on, it became more and more threatening, till the sky became entirely overcast.

Upon leaving the town, we began at once to ascend the small foothills which extend several miles from the larger peak. After gaining a small plateau above the city, we passed through the village of San Francisco, a place with which the mules were evidently familiar, as they wanted to enter every pulque-shop and drinking-place along the street. We finally succeeded in getting them past temptation, and followed the rough road for several miles beside an old stone aqueduct which brings water from the mountain springs to San Andres. After an hour's riding we left the main road and the old aqueduct and followed one of the many mountain trails, which are generally only rough paths. The ground rose quite rapidly most of the time.

At one o'clock we stopped near a little stream for lunch. Here the Mexican guides built a fire and fed the mules, while we rested. After a stay of about an hour we started on again, and now the clouds had become so heavy that a few hailstones and a little rain fell at times. There was every prospect that there would be snow a little higher up, and the guides held a council to see if all were provided with colored glasses. Not expecting a storm, none had been brought; so one of their number started back after them, intending to overtake us before we should need them. We were then fully ten miles on our journey, and had reached an elevation of about eleven thousand feet, or three thousand feet above the town we had left that morning. This Mexican, who started back at two in the afternoon, went to San Andres, got the glasses, and overtook us at an elevation of thirteen thousand feet at four o'clock next morning, making a trip all the way on foot of fully thirty miles, with a descent of three thousand feet and an ascent of five thousand.

We now continued up the mountain, but soon had to stop under a large pine-tree because of the heavy rain and hail. We built a good fire, and made ourselves quite comfortable; but, as it was getting late and we could not stay there all night, we started on in the rain. There was but one umbrella in the party, but we managed to keep partly dry with the aid of some large *petates*, or wicker mats, which we put around us. We had now reached an elevation where it had snowed a short time before, making a couple of inches of slush, through which the Mexicans walked for two hours with only their leather sandals on their feet. After winding around among the hills and smaller peaks, we came into a little valley whose upper end vanished in the clouds. Riding up this valley for half a mile, the guide turned toward the steep side to the west, and, climbing up a few feet, we saw the place where we were to pass the night, "La Cueva del Muerto," or Dead Man's Cave. It was a cave about large enough for the whole party to get into, and with a good fire we were soon dry and comfortable. It was dark when we reached this refuge, and was rapidly growing cold, a change very noticeable at high altitudes.

Next morning at daylight we were ready to start on the last stage of our ascent, and soon three of the party were again on their mules, and following the guides, who now had wrapped their feet in plenty of heavy cloth as a protection against the sharp volcanic rocks and the snow. The fourth of our company had not been well the night before, and was now too ill to continue, so he was left at the cave with a native. It had partly cleared during the night, and we could now see the great peak ahead, and behind us the smaller hills over which we had come the day before, and part of the immense valley below with a few small villages.

At 7.30 we had reached a point beyond which the mules could not go, and from there on we must climb. The ground was very rocky, in fact was part of a great lava stream, which at some past time had flowed down the side of the mountain. This stream reached nearly to the summit, which did not seem to be over half a mile away. The guide, when questioned, said that it would take us seven hours to get to the top, and he was right. Here the real climb began, over about two inches of snow covering the roughest pile of rocks that can well be imagined. A guide stayed with each of the party, and each one took the gait that suited him best. At ten o'clock the top appeared no closer than it had at seven, but the distance below, over which we had just come, seemed a long way. Now the clouds began to blow over the crest of the great mountain, and at times completely surrounded us, while at other times they cleared away, and the sun shone down through the rare atmosphere with a terrible heat. It was impossible, at that altitude, to go more than a few steps without resting, and before reaching the top the exhaustion attending every slight effort became very troublesome. As the day went on, the clouds became heavier and more numerous, so that when, at 1.15, I reached the edge of the crater, I could see across it or down into it only by short glimpses. It was very cold and the wind was blowing a heavy gale. White frost was forming on our clothing, and it was impossible to stand still very long. The crater of this famous mountain is much smaller than that of Popocatepetl, probably a thousand feet across and about the same depth; the inside is much steeper, going almost straight down on all sides, and the edge so liable to cave in under one that it is dangerous to get very close.

After a stay of a few minutes at the edge of the crater we went around to the highest point, only about fifteen minutes' climb. Here is an old cross made of iron pipe, which zealous piety went to great trouble to put up, now blown down by the wind. We took our barometer readings, and, on account of the intense cold and the discomfort arising from the great altitude, at once prepared to descend. After going down some eight hundred feet, I met another of the party who, with the assistance of two Indians and a rope, was taking an easy way to reach the summit. A short distance farther down I met the guide who had overtaken us at four that morning, bringing up a note from the third member of the party, who had turned back at an elevation of over seventeen thousand feet.

The descent to the cave was marked by no incident worthy of special mention, and after spending another night here, we set out early for San Andres, making close connections there with the restaurant and the train for Mexico. It is unfortunate that no good photographs of the crater were secured, but the dense clouds and various other causes prevented. The barometer readings indicated an altitude of about eighteen thousand six hundred feet, or some eight hundred feet higher than Popocatepetl.

The Altitudes of Orizaba and Popocatepetl.

BY A. E. DOUGLASS.

Read October 20, 1897.

THE recent ascent of Orizaba described by Mr. W. H. Cogshall in the preceding article, and in which I participated to the height of 17,300 feet, gives me the occasion for some remarks upon the altitude of the two great Mexican mountains and upon the effect of high climbing or so-called mountain sickness.

The peak of Orizaba is situated about half-way between the city of Mexico and the coast, and upon the very edge of the tableland, so that the ascent from the east is four thousand feet greater than on the inland side. It is undoubtedly higher than Popocatepetl, and therefore probably the highest mountain in North America.

Readings of a mercurial barometer placed upon its summit were made by Miss Annie S. Peck[1] and Mr. W. A. Cogshall of our expedition, on April 29, 1897. The mercury stood about half an inch lower than upon the other mountain, thus indicating a difference in altitude of some eight hundred feet. The mean reading on Orizaba was a trifle under 15.40 inches, and the temperature of the air was 26.4° F. But during the observation the upper portion of the mountain was enveloped in cloud, and a gale was blowing over it; there was probably a clear space over the level country between Orizaba and Mexico, and it is certain that at the city of Mexico the sky was entirely cloudy. It is probable, therefore, that local meteorological conditions considerably affect the result.

One of the most complete measurements ever made was by Dr. F. Kaska of Mexico, who ascended three times to the summit, and spent a number of nights there. His results with a mercurial barometer place the height of the mountain at 18,260 feet.

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[1] Of the New York World expedition. Thanks to her, Mr. Cogshall obtained readings of her Fortin barometer at the top of the mountain, the barometer loaned me by the Mexican Meteorological Observatory having been broken. Miss Peck's discussion of her results, with calculations made by the United States Weather Bureau, will appear, as I understand, in the National Geographical Magazine.

Various measurements[1] of the heights of these mountains are as follows: —

POPOCATEPETL.

Observer.	Published result.		Using Heilprin's Corrections.	Year.	Method.	Authority.
	m.	ft.	ft.			
1. Humboldt.	5403	17,713	17,590	1804	Triang.	Humboldt's Cosmos.
2. Glennie .	5451 5492	17,884 18,017 *a*	(17,758) (17,891)	1827	Merc.	Humboldt's Cosmos.
3. Birbeck .	5442	17,854	17,728	1827	Merc.	Humboldt's Cosmos.
4. Doignon .	5403	17,726	17,600		Merc. ?	Humboldt's Cosmos.
5. von Gerolt	5150	16,896 *b*	(16,770)	1833	Merc.	Humboldt's Cosmos.
6. Craveri. .	5291	17,360 *c*	(17,234)	1855	Barom.	Humboldt's Cosmos.
7. Carl Heller	5408	17,745 *d*	(17,619)	1856 ?		Humboldt's Cosmos.
8. Sonntag .	5420	17,785	17,659	1857	Triang. Barom.	Smithsonian Cont. Know. XI. *e*
9. Ponce de Leon. .	5391	17,688	17,616	1870	Triang.	Boletin Mensual del Observatorio Meteorologico-Magnetico Central de Mexico, Abril, 1897 (and Sr. Zendejas).
10. Almazan .	5406	17,737	17,637			
11. Glennie, Taylor & Quintana	5463	17,924	17,824			
12. Burkart .	5353	17,563	17,463			
13. Aguilera & Ordoñez.	5450	17,881	17,781		Hipsom.	
14. Heilprin .	5341	17,523 *f*	17,523	1890	Aneroid	Proc. Phil. Acad. Sci. 1890, Pt. II.
15. Douglass .	5436	17,815 *g*	17,743	1897	Merc.	Appalachia, July, 1897.

Notes.

a As corrected by Burkart, but thought by Heilprin to be more nearly right.

b Taken at Roca del Fraile, below crater.

c Altitude here increased 200 feet to reduce to Humboldt's standard elevation of the city of Mexico.

d Humboldt merely describes Heller's result as within 32 feet of his own; it may therefore be 17,681.

e I take this reference from Heilprin's Report in the Proceedings of the Academy of Natural Sciences of Philadelphia, 1890, Part II.

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[1] Sr. Zendejas mentions as additional reference, Beiträge zur Geologie und Paläontologie der Republic Mexico, von Felix y Lenk, I Thiel, Leipzig, 1890.

f Heilprin uses the tables of Delcros, and obtains practically the result given by the Smithsonian tables (based on those of Guyot), omitting the humidity correction. The correction in the latter tables for an average degree of humidity amounts to + 70 feet.

g My result by Smithsonian Meteorological Tables, 1896, using a humidity correction of + 39 feet, for observed relative humidity; for an average amount of humidity the height becomes 20 feet more. Señor Zendejas of Mexico obtained 5400 metres (17,717 feet), using the tables of Mathieu without humidity correction, and 5417 metres (17,772 feet), using the formula of Diaz Covarrubias, probably also without humidity correction. (See "Boletin Mensual" as quoted for Ponce de Leon and others.)

ORIZABA.

Observer.	Published results.		Using Heilprin's Corrections.	Year.	Method.	Authority.
	m.	ft.	ft.			
1. Ferrer . .	5450	17,879		1796	Triang.	Humboldt's Cosmos.
2. Humboldt.	5296	17,375 *h*		1804	Triang.	Humboldt's Cosmos.
3. Almazan .	5461	17,917				Sr. Zendejas, Mexico *i*.
4. Langara .	4558	14,955 *j*				Sr. Zendejas, Mexico *i*.
5. Reynolds .	5431	17,818		1848		Boletin del Observatorio Met.-Mag. Cent. Mexico, Abril, 1897.
6. Doignon .	5586	18,327		1851		
7. Ratzel . .	5509	18,074				
8. Smith & Roberts.	5510	18,077				
9. Niox . .	5520	18,110				
10. Saussure .	5395	17,700				
11. Scowell .	5434	17,829			Aneroid	Sr. Zendejas, Mexico.
12. Kaska . .	5565	18,260		1874–77	Merc.	Dr. F. Kaska, Mexico *k*.
13. Plowes, Rodriguez, Vigil . .	5384	17,664	17,416	1877	Triang.	Heilprin's Report in Proc. Phil. Acad. of Sci., 1890, Part II. *l*.
14. Müller . .	5521	18,112		1884 ?	Triang.	
15. Heilprin .	5549	18,205 *m*		1890	Aneroid	
16. Cogshall .	5630	18,470 *n*	18,400	1897	Merc.	Present Paper.
17. Miss Peck.	5669	18,600 *n*	18,530	1897	Merc.	Present Paper.

NOTES.

h Humboldt states that in his measurement the mountain was distant, and the angles of elevation were small; he himself therefore adopts Ferrer's result.

i These data were very courteously collected and forwarded to me by Señor Don José Zendejas, subdirector of the Central Meteorological Observatory in the city of Mexico. The article in the "Boletin," also cited as an authority, was written by him. I cannot say whether the six values here quoted from the "Boletin" were independent measures or not; the similarity between Ratzel, Smith and Roberts, and Niox suggests that these three were not independent.

j Probably some other part of the mountain, or, perhaps, summit of "La Montaña," near Orizaba.

k In his letter, Dr. Kaska regrets that he had mislaid the notes made on his various ascents, but gave the height derived from readings of a mercurial barometer as 5564.8 m. Heilprin, quoting from Myer's Konversations-Lexikon, calls it 5500 m. Dr. Kaska obtained readings of an hypsometer, also, but had not reduced them.

l Heilprin quotes Müller's result from Grisebach, in Vegetation der Erde, 2d ed., 1884, II., page 563; and the result of Plowes, Rodriguez, and Vigil from Anales del Ministerio de Fomento, III., 1877, pages 99 and 113 (Mexico). Sr. Zendejas also refers to this authority.

m From Delcros' tables, omitting, as before, the humidity correction, which amounts to + 67 feet according to the Smithsonian tables.

n Based on the Smithsonian meteorological tables, 1896, and obtained in the following way: A comparison with observations made in the city of Mexico at the same hour gave for the "Published Results" 18,598 and 18,733 feet, respectively, using a correction of + 43 feet for observed humidity. Sr. Zendejas, using the same observations that gave the 18,733 above, obtained 5694 m. (18,681 feet), but upon comparing with observations at Puebla, he obtained closely 5650 m. (18,537 feet), and with observations at Vera Cruz, 5600 m. (18,373 feet). As the mountain is not very far from Puebla, the interpolated figure becomes about 5635 m., or about 200 feet below the Mexican value; and we must assume that this 200 feet includes the error found by Heilprin for the level of the city of Mexico. Applying corrections of — 130 and — 200 feet to the first results above gives the heights entered in the two columns of the table, which therefore depend on the correctness of the elevation of Puebla as used by the Meteorological Bureau.

Many minor errors and disagreements in these heights arise from differences in the tables for computing altitudes, as was evident in the notes. The humidity correction is important, and in the Smithsonian tables should not be omitted in either the English or French measure. When the humidity is not observed, the correction should be taken from the English measure, even though the observations be in French measure.

Errors also arise from variableness of the meteorological conditions, and this is probably one of their chief sources. Even the best tables cannot correct perfectly an individual observation, on account of the (usually) large horizontal separation of the upper and lower stations. So an average of all good measures tends to eliminate errors due to this cause.

But errors also arise from mistakes in standard levels, and when one is detected, the previous values of the mountain-height should be revised. This Heilprin has done so well for Popocatepetl that I need do little more than give his corrections a general application. He found an error of 126 feet in the level of the Plaza of the city of Mexico (it was formerly too high), and quotes Sonntag as authority for believing that all previous computers had also used this erroneous value. Hence we correct for an error of 72 feet in the altitude of the lower station in the last measures of the two mountains; and for the remaining measures, whose dates I have not learned, an approximate error of 100 feet is assumed. From the same source, the railroad surveys, he found a large error in the result of Plowes, Rodriguez and Vigil upon Orizaba. However, with regard to other measures of Orizaba, I cannot assume any particular error from my ignorance of their comparison stations.

Accordingly I have added a column in the two tables in which these corrections are applied, and I use the values in that column in preference to the published results.

In combining these observations to get the most probable value of the heights of the mountains, the doubtful figures, in parenthesis, are discarded at once. With regard to Orizaba, the disagreement in the remaining values is so large that a number of results are undoubtedly in error. Ferrer may be right; Humboldt is admittedly wrong; Almazan I know nothing about; Langara is obviously wrong; we know practically nothing about those quoted from the "Boletin;" Mexican meteorologists look askance upon the results of Plowes, Rodriguez, and Vigil; Scowell and Heilprin used aneroid barometers.

For better comparison the measures and methods of measurement are placed in the following list; the method is denoted by a letter, following the height: T denotes triangulation; A, aneroid barometer; M, mercurial barometer; H, hypsometer.

POPOCATEPETL.	ORIZABA.
17,463 ? *	17,416 T *
523 A *	700 ? *
590 T	818 ? *
600 M (?)	829 A *
616 T	879 T
637 ? *	917 ? *
659 } T	18,074 ? *
659 } M	077 ? *

728 M	110 ? *
743 M	112 T
781 H, weight ½	205 A *
824 ? *	260 M, weight 2
	327 ? *
(17,646 ± 78)	400 M
	530 M
	(18,057 ± 226)

The omission of any of these in an attempt to get the most probable means is perhaps a questionable procedure, but it is certain that if we wish to restrict the figures as nearly as possible to a uniform standard of excellence, we should discard the least reliable, namely, those about which nothing is known and those obtained from aneroid barometers. Making these omissions as indicated by the asterisks, we obtain: —

Popocatepetl	17,660 ± 50 feet, or 5384 ± 15 metres.
Orizaba	18,240 ± 160 feet, or 5560 ± 50 metres.

Effects of High-Mountain Climbing.

By A. E. Douglass.

Read October 20, 1897.

Mountain climbing is a sport in which all the powers of endurance are brought into play. At low altitudes it is a question of firm muscles and of a sound heart; at high altitudes the lungs and digestive organs as well are put to a tremendous test. The various complaints, apart from mere fatigue, which have compelled persons to turn back, are, so far as I have seen or heard of them, nausea, high pulse, severe headache, intense nervous excitability, and hemorrhage. These are named with reference to frequency and seriousness, the first being the most frequent and at the same time least serious. It has been a matter of interest and some amusement to me to notice that in a person's first experience (if accompanied with exertion) these symptoms are never acknowledged to be due to the altitude.

[illegible]usea is such an ordinary thing that a great many people become sick while passing in a railroad train over the road from Arequipa, Peru, to Puno on Lake Titicaca, when the railway reaches an elevation of only 14,700 feet. In this case there is a minimum of exertion; when the ascent is accompanied by hard work the liability to nausea is much greater. If nausea occurs at night it need not be feared, for day will bring relief, but when it occurs by day it is usually best to turn back at once. There is as yet that unexplained difference between night and day. Night seems to have a very severe effect in comparison with day, all the symptoms of high altitude being exaggerated; day always brings a measure of relief. For example, one enthusiast who was sick at ten thousand feet climbed four thousand feet on foot the next day. Another sick at sixteen thousand feet, and a third feeling nauseated at fourteen or fifteen thousand in the morning were both obliged to go back at once. Several times at altitudes over sixteen thousand feet I have felt the first faint suggestion of nausea as the result of over-exertion; in each case it has disappeared in a few moments, leaving behind it a slight headache. People who are occasionally sick in this way at low altitudes are the ones most liable to nausea when far above the level of the sea. It is true of this, as well as of all other symptoms of mountain sickness, that if one takes absolute rest on the very first approach of the uncomfortable feeling, the real sickness may be warded off provided the altitude is not too high. Even if the altitude is very high, the sickness may sometimes be reduced to a mere headache, which, however, is liable to persist for some time thereafter.

High pulse, or palpitation of the heart, affects many people at altitudes which could not be considered very high. Even as low as four thousand feet special complaints of heart trouble are heard, but I have suspected that it might be aggravated by the very dry climate in which the persons were living. Really high altitudes are very quick to affect the pulse. A certain scientist relates that at the top of Pike's Peak, a little over fourteen thousand feet above the sea, his pulse went up to 147 per minute. This is dangerously high. Another found on Popocatepetl, that after riding horseback five hours, from 8,300 to about 13,000 feet, all appetite was gone and his pulse was so high as to cause some discomfort. After lying down a few hours, making absolutely no exertion whatever, the heart's action lessened, and at four in the morning he was ready to start for higher altitudes; nor was the pulse materially affected by the subsequent climb to the very top. In camping at very high altitudes it is decidedly advisable to sleep with the head somewhat elevated.

An incident which befell me several years ago resulted from an abnormal action of the circulatory system. In one of my first ascents I rode on mule-back for some nine hours, from 8,000 to 16,650 feet, and when at about 16,400 feet I counted my pulse and found it 120. Almost immediately after I was overtaken by an attack of vertigo, from which I was perhaps unconscious for an instant. Nevertheless in a few minutes we went on and shortly after camped for the night, and the next day I was able to go on mule-back and on foot some two thousand feet higher. As I have made that same ride many times since without the ill effects then experienced, I attribute the attack of vertigo to one or both of two things: either the wearing of a close-fitting felt hat, without lining, in a fierce tropical sun, or a very late dinner that day, taken at too high an altitude to allow digestion to work properly.

As already shown, an abnormally high pulse at night is not serious, for day may bring relief; but if it is so high at night that one loses sleep, then a degree of exhaustion ensues, and it is with the greatest difficulty that any more climbing is done the next day. Many persons give out from that cause, and it nearly caused failure on my first high ascent. On that occasion we climbed on foot from five in the morning till four in the afternoon, stopping one hour for lunch, and reached an altitude of 18,600 feet — an extraordinary altitude for spending the night. By that time I found that climbing only a few feet made the pulsations of my heart feel very uncomfortable, and while I was helping into a more comfortable position one of my companions who seemed much more used up than myself, a sudden feeling of sickness at the stomach came over me, with some headache. The feeling of sickness soon passed away, but the headache and jarring pulse and burning thirst remained to keep me awake nearly all night. I had reached the camping place before any of the others, but the next day it took me twice as long as it did them to reach the crater, a matter of only five hundred feet. It was the most complete exhaustion I ever experienced.

There is a combination of increased pulse and indigestion which affects some people very badly. It is brought on by overexertion, and is like the effects of the same thing at low altitudes. With great care after the first approach of the symptom, any serious trouble may be warded off, but if the weather is cold and rests for that reason are wellnigh impossible, repeated attacks come on, and it is merely a waste of time to remain longer at that altitude. It can best be described as an exceedingly disagreeable and enervating feeling located generally over the chest and stomach. Perhaps it chiefly affects those who are never subject to actual nausea.

I have never personally seen any one obliged to turn back from any of the three remaining causes, headache, nervous excitability, or hemorrhage. Perhaps headache ought not to be included in this list, because it seems to be a general result of high altitudes rather than a special characteristic of the person climbing. But for that reason it certainly deserves mention. It seems to follow the other symptoms. However, in some cases persons have ridden to 18,000 feet and only complained of a slight headache. One, at least, has climbed on foot from 14,000 to over 18,000 feet in less than six hours, and then hardly felt ill effects of any kind. In most cases a headache persists some time after return to lower elevations.

Only one case of nervousness has been described to me, and that occurred in a person who was naturally of a nervous temperament. Spending the night in a hut at an altitude of a little under 17,000 feet, he found his faculties confused and himself in an extremely excitable state, so that he could not lie still. For many hours he walked backwards and forwards, until finally day brought relief.

The several cases of death on high mountains, which have not resulted from cold, losing one's way or other common causes, have all resulted from hemorrhage. This results from the breaking of large blood vessels; blood issues from the mouth, nose and eyes, and death comes too quickly for the patient to be brought down. But in the majority of cases where bleeding occurs there is ample time to get to a lower altitude and obtain relief. A little bleeding at the nose is of very slight consequence. A certain gentleman rode from 8,000 to 13,000 feet, and in the evening ran several hundred yards to test his condition. As a result his nose bled for a considerable time, but the next day he was by far the most active of his party in climbing on foot and, it is said, broke the record for the ascent of Popocatepetl.

High-mountain climbing does not always affect the same person in the same way, being dependent on his condition at the time of making the ascent. Nor does it affect all members of the same party alike, for it seems to touch in each the part which at the time is weakest; thus, some complain of indigestion, others of palpitation, and so on. Headache seems to be the only general symptom, for it affects almost every one and often persists for some hours after descent.

In view of the great difficulties in high-mountain climbing, much attention should be given to planning the trip beforehand in a thorough manner. One may adopt either of two ways: he may either follow Whymper's excellent example and remain two or three days at an altitude of about 16,000 feet to become accustomed to the rarefied air, or, if his time is more limited, he may make a dash for the summit, accomplishing the whole trip in the shortest time possible. For scientific or geodetic work Whymper's plan is much the best, and in the end entails less discomfort though more time and expense. It is in the rapid trips that much care is necessary in deciding upon the place to pass the night, the food to take, and the general supplies.

In two-day trips, such as Popocatepetl and Orizaba, the night is very properly passed at an altitude where mountain sickness is not likely to prevent sleep, that is, at about 13,000 feet. In quick climbs up to 19,000 or 20,000 feet I am still inclined to think this the best altitude for spending the night, making up for it by getting an early start the next morning. It is always best to spend the night at as low an elevation as possible. All this precaution is necessary from the fact already mentioned, that all the symptoms of mountain sickness are greatly aggravated at night.

In the way of food, a large quantity is not necessary for quick trips, but it should be of the kind most easily digested. Beef tea or other liquid foods should be taken, or fresh meat may be carried and a broth made from it. Bread without butter, toasted at an open fire, and water as hot as one can drink it, seem to tone up the stomach and do it good. It is doubtful if alcoholic stimulants are beneficial, the pulse being already greatly accelerated by the altitude and the exertion; but if one is suffering from the cold and is entirely accustomed to their use, it may change failure into success. It is, of course, best to have stimulants with one for use in case of an emergency. I recollect on one occasion being overtaken by night, and afterwards getting into a pool of water not yet frozen over — it was above snow line — and then being greatly comforted mentally and physically by its use.

The Indians who have lived for generations at high altitudes, and who are accustomed to severe labor at great heights, are, both in Mexico and in the Titicaca Basin, of small but powerful build, and have magnificent chest development. They belong to races that are used to carrying burdens on their backs, and so their limbs are strong. Near volcanoes many of them are in the habit of climbing for sulphur, and the work that they can do amidst conditions that entirely exhaust the traveller is phenomenal. In the ascent of the volcano, El Misti, at Arequipa, Peru, one Indian actually carried two packs of full weight, taking the first up a certain distance and then descending for the other, and made such good time that when we decided to camp for the night he, with the others, had already reached the crater, five hundred feet above us, and was recalled with the greatest difficulty. Years of practice would be necessary before we could perform such heroic labor.

The true mountain climber, it is said, enjoys every step of his climb. Yet, judging from what I have seen at altitudes over 16,000 feet, enjoyment at high altitudes is impossible for those who climb any great distance on foot. The exhaustion of climbing under such conditions is so severe as to take away most of the enjoyment in the exercise and in many cases renders the work detrimental to health rather than beneficial. It therefore seems to me legitimate, at elevations over 16,000 feet, to take every possible advantage in the way of assistance, either by riding on animals or by being pulled up the slope by Indians, as is often done on Orizaba. Such assistance is practically always available on the high mountains in the tropics; either ice or sulphur is in demand in the towns below, and many Indians make a business of going to high altitudes.

Especially is this to be recommended, it seems to me, when the climber desires to obtain results of scientific value. The condition in which the observer finds himself makes a great difference in the results obtained, and everything beneficial to mind and body should be resorted to from a sense of duty to himself and those for whom he is gathering information.

A Winter Trip to Top of Mts. Washington and Adams in 1892.

BY RICHARD E. DODGE.

MY apology for offering this brief account of an expedition of five years ago is that I believe it records experiences in the White Mountains that are unique. On December 23, 1892, a party of five students, J. S. Stone, Geo. White, C. P. Blaney, M. A. Read, and myself, set out for a few days' outing in the mountains, making our headquarters with the genial and kindly proprietor of the Ravine House, at Randolph, Mr. Laban M. Watson. But one of the party had ever had any practice in snowshoeing, and we looked forward with great interest to the experiences ahead of us. We laid our plans for a few days' preliminary practice in our newly acquired art before attempting any difficult tasks.

With the temperature varying from +10° to —20° F., and in the face of heavy winds, we devoted the first four days of our stay to trips into King's Ravine, to Pond of Safety and Point Lookout, and to games of football in the deep snow, with a bag of hay for a ball. Christmas day was devoted to a trip to King's Ravine, in a howling snowstorm and with a zero temperature. The walking was fine as soon as we reached the woods, where the snow was deep and untrodden. The scene on the large boulders in the Ravine was beyond description in its magnificence. The trip to Pond of Safety was an easy one, for the day was clear and the temperature comparatively high, +10° F. Shoeing was good and path fairly plain. Saw squirrel, woodpecker, grouse, and chickadee, also rat and fox tracks, which showed the woods to be more inhabited than we had supposed, and that the denizens had been actively hunting since the recent storm.

On December 28, at 9.15 A. M., Stone, White, Read, and myself started for the top of Mt. Adams. The air was clear as could be; the humidity low, and every sign was favorable. We followed our track of December 25 for a distance, and then took Air Line path for summit. Snow was heavy and path breaking difficult. At wood line we took off our shoes, and, strapping them to our backs, crawled the length of the crest and then walked to Madison Hut, where we lunched.

Thermometer registered 19° F. on north side of hut, but it was thawing in the sun. Reached hut at 1.15 P. M. Rested there some time and then started for summit of Adams, reaching there at 2.55 P. M. The view was unobstructed, there was no wind, and the thermometer registered 10° F. After registering on the roll, as we had at the hut, we started down at 3.15, and by careful crawling and walking, reached the wood line at dusk, and home at 6.45, by bright moonlight. We were fully ready for the hearty supper that awaited us.

The next morning, our party reinforced by Blaney, G. B. Henshaw, and Master Thomas, we rode to the Glen House, to start up Mt. Washington by road. Leaving toll-gate at 11.47, we snowshoed for three miles, but soon found that we could make more progress on the crust without shoes; so leaving our impedimenta at the Half Way House, we pushed on, reaching summit at 3.50, without any discomfort except lack of water. We ascended to highest point and found again our view unobstructed, the wind slight, and the thermometer registering 4° F. After giving three cheers for Harvard and Massachusetts Institute of Technology, we started hastily downward. We had time to note the eighteen inches of frost on the handrail of Summit House and certain of the glacial phenomena. As we descended to the wood line, we saw the twilight arch rapidly advancing, and broken by the shadow of the Presidential Range, our first view of a mountain shadow and one that we shall never forget. Our descent was easy and uneventful, except for a few minor accidents attendant upon assuming positions of repose with too great haste. At 7.05 we reached the toll-gate, hungry, but by no means weary; the only signs of wear were a little stiffness of the knees, due to the descent over crust. Our supper of baked beans and accompaniments, served at the Glen House Annex, was most agreeable, after our scanty lunch on frozen chocolate and semi-solidified sandwiches.

We all went to sleep happy in the thought that probably we had broken the record for climbing the White Mountains. On December 31, after we had visited one or two more local places, and seen the life of the loggers, we started for home. As we looked back from Jefferson for our last glimpse of the north side of the Range, we saw small clouds gathering at the level of the Ridge crests, — the first signs of moisture on the mountains for three days.

During the week we had walked about thirty-two miles, on our shoes, and considered ourselves no longer novices. We had had a restful and health-giving outing, and under the kind care of our host had each gained so many pounds of flesh that we do not wish to record them. The impressions of the mountains in their winter glory are so vivid and so beautiful, that at least one of the party has not yet been able to persuade himself to visit the same region in summer.

Report of the Recording Secretary for 1897.

On January 1, 1898, the corporate membership of the Club was 960. The losses during 1897 amounting to 87, and the accessions to 134, and five memberships having been revived, the net gain for the year was 52. The Honorary Members numbered 20, William Martin Conway, Joseph LeConte, Vittorio Sella, and Edward Whymper having been elected. Gardiner G. Hubbard was elected to honorary membership in January and deceased in December. The Corresponding Members numbered 49, E. Deville, J. J. McArthur, Harry F. Reid, and Warren Upham having been added to the list. There were 91 Life Members. The total membership was 1029, a net gain of 54.

There were held during the year nine regular and two special meetings and one field meeting. Only two of the meetings were held in the afternoon; these and the June meeting had an average attendance of 73, while the average attendance of all the meetings was 108. It is evident that the evening suits the majority. In the early days of the Club the meetings were usually held in the afternoon, and some members still prefer this. In selecting the evening of the week, it is necessary to avoid engagements of room 11 for other societies and for Institute lectures, and at the same time meet the convenience of our own invited speakers, not to mention the President, Secretary, and lantern operator. Unfortunately there have been several conflicts with the meetings of the Society of Natural History, but a special effort can be made the coming year to avoid this.

At the various meetings there were presented eight reports and twenty papers, of which nine were illustrated with the lantern. There were also seven accounts of trips made during the winter excursion. Mexico has had three papers, Canada two, Washington, Montana, Oregon, Arizona, North Carolina, New Hampshire, and Massachusetts, one each. An unusual number of papers of scientific interest have been presented: the Harvard Geographical Models, Glacial Lake Bouvé, the Evolution of the Great Lakes and St. Lawrence Waterway, besides papers upon forests, birds, lichens, and mushrooms.

A large and successful field meeting was held at the Profile House, White Mountains, N. H., from July 3 to 12, and there was a successful camp on and near the Club land at Randolph, N. H., from August 13 to 27. Accounts of these and other excursions will be found in the report of the Excursion Committee.

The Snow-shoe Section held its annual meeting in January. As usual the snow-shoeing near Boston was not good, but a successful trip was made in February to Woodstock, Vt., by about sixty, quite a number of whom ascended Killington Peak and Mt. Ascutney.

The annual social meeting was held at the Hotel Vendome on Friday evening, February 15. One hundred and fifty-four tickets were sold. The Room Committee also held several social meetings at the new Club rooms, which were largely attended and much enjoyed by members and friends. This feature of the Club life should become regular and permanent, not only for its social advantages, but for the opportunity it gives to exhibit photographs and many objects of scientific and mountaineering interest.

Attention is called to the reports of the various Councillors, which show commendable activity in a wide range of work. The position of Councillor of Natural History has been vacant since the death of George L. Chandler, October 7, 1897. This is the first time that the Club has lost one of its officers by death. During his membership of fourteen years Mr. Chandler had been an active and interested member. There deceased also, on March 25, 1897, Charles Eliot, our Councillor of Topography from 1890 to 1892. The Appalachian Mountain Club acknowledges its indebtedness to him for intelligent and energetic work, and Greater Boston must always remember him as one of its chief benefactors.

Only one number of APPALACHIA was published during the year, — Vol. VIII., No. 3, in July. In the same month there was also published the Guide-book, "Walks and Rides in the Country round about Boston." Replete with information of scenic and historic interest, the book was favorably received and met a ready sale. Early in the year a contract was made with Houghton, Mifflin & Co. as Selling Agents and Publishers for all publications of the Club.

The Trustees of Real Estate present a very gratifying report. Early in the year Miss Anne Whitney, an interested member of our Club and a lover of the grand and beautiful in nature, generously conveyed to the Trustees twelve acres of land upon the right bank of the Androscoggin River, in the town of Shelburne, N. H. In December our loyal and energetic ex-President, Albert S. Parsons, together with relatives, presented to the Trustees forty acres of land in Warwick, including the northerly summit of Mount Grace. This is our first holding in Massachusetts and the fourth in all. The first was the site of the Madison Spring Hut, N. H., about one acre, given to the Club by the Brown's Lumber Co. in 1888. The second was the lot of forest land along Snyder Brook, Randolph, N. H., 600 feet wide and nearly a half mile in length, purchased in 1895. We all hope that the Trustees of Real Estate may find the coming year one of even greater prosperity.

The year 1897 has also been marked by another event which the writer believes to be one of great importance in the history of our Club, — the organization of an Alpine Section, whose object shall be to encourage expert climbing of a distinctively Alpine character, and in particular among the mountains of North America. This section has already organized with Mr. Charles S. Thompson of Chicago, Ill., as Secretary.

Respectfully submitted,

ROSWELL B. LAWRENCE,

Recording Secretary.

Report of the Corresponding Secretary for 1897.

THE Corresponding Secretary and Librarian is pleased to report that the pleasant relations which have hitherto existed between the Club and its correspondents have been maintained during the year by numerous letters and the exchange of courtesies. The present number of such institutions is 97, 7 of which have been gained during the year. The number of publications received from societies is much larger than heretofore, being about 115 volumes of current issues. Besides these, some 60 Bulletins of Proceedings have been received in answer to letters of request from the Corresponding Secretary, whereby the series of publications on our library shelves have been made much more complete. The largest single donation in the way of publications that the Club has ever received, and one whose value is the greater from the thoroughness with which it treats its subject, is the set, nearly complete, of the Meddelelser of the Commissionen for Ledelsen af de geologiske og geographiske Undersøgelser i Grønland, of which sixteen volumes have been received. The Société des Touristes de Dauphiné has sent fifteen volumes of its annual; the Società Geografica Italiana, nine of its earlier volumes; the Instituto Geographico Argentino, six volumes; and the Société Géographique de Paris, two volumes. Of the Geographische Abhandlungen, a classic in its department, the five volumes already issued have been contributed.

As in previous years, a few periodicals which cannot be secured by exchange have been purchased through the kind assistance of Mrs. J. H. Thorndike.

The accessions to the library for the year are given in detail below, from which it may be seen that, besides the exchanges, 88 volumes have been added, 19 of which have been purchased, 25 given by the author or the publisher, and 44 by members of the Club. During the year the Club has received from their authors pamphlets to the number of 63, and from other persons 37. Of maps the library has received 52, most of which are from the United States Geological Survey.

The collection of magazine articles relating to the White Mountains, mentioned in the report for last year, has been continued, and many of those which were lacking have been secured. The most important gain in this department has been a series of the Granite Monthly, the gift of Mr. E. C. Eastman of Concord, N. H. Miss Isabel Batchelder has made the largest single contribution to our stock of magazines, — fourteen of the earlier volumes of the Atlantic Monthly, — every number of which includes some article of interest to the Club members. Mr. Legh R. Pearson, not a member of the Club, has sent to us odd numbers of the Atlantic Monthly, amounting to perhaps nine volumes. The publishers of Meehan's Monthly have contributed a complimentary copy of the magazine, which has been highly appreciated by our botanists. Land and Water has also come to the library free.

The display of the books which is now possible has aroused the interest of members in the library, and many volumes have been given by them. Some of these are recent publications, but among the number may be noted many older ones, which the Club is exceedingly glad to receive and preserve. These books have been noted on the circulars of the monthly meetings, and are given in detail in the appended list.

The "nature" books, of which Bolles, Burroughs, and Torrey have produced such excellent examples, have been exceedingly popular among the readers, half of them being continually absent from the shelves. A number of the other volumes given to the Club are equally popular, some of which have not been long enough in the rooms to have had a place assigned to them on the shelves.

The record book shows a gratifying increase in the number of books taken out by the members, averaging now about one a day. This figure is not very accurate, however, since many volumes are taken out without the proper memorandum having been made in the register. The principal use of the library is, moreover, for consultation, many volumes being consulted to one that is taken home. During the year the Club has sent some of its volumes to Europe, a number having gone to Prince Luigi of Savoy, who could not find nearer at hand the information which he wished before attempting the ascent of Mount Saint Elias.

Respectfully submitted,
JOHN RITCHIE, JR.,
Corresponding Secretary.

ACCESSIONS TO THE LIBRARY FOR THE YEAR 1897.

EXCHANGES.

Academy of Natural Sciences. — Proceedings, 1896, 3; 1897, 1, 2.

Alpi Illustrati, 1–6.

American Geographical Society. — Bulletin, XXVIII. 4; XXIX. 1–4.

American Museum of Natural History. — Bulletin, VIII.; Report, 1896.

Annalen des kais-königlichen Naturhistorischen Hofmuseums, XI. 2–4.

Boston Public Library. — Bulletin, II.; III. 1, 2; Report, XLV.; List of periodicals; Annual list of new and important books.

California Academy of Sciences. — Proceedings, 3rd Ser. I. 1–3; Occasional Papers, V.

Centra Excursionista de Calalunya. — Butlleti, 28–31.

Commissionen for Ledelsen af geologiske og geographiske Undersøgelser i Grønland. — Meddelelser, I.–XIII.; XVII.–XIX.

Club Alpin Belge. — Bulletin, 23.

Club Alpin Français. — Direction Centrale: Bulletin, 1897, 1–11; Annuaire, 1896. Section des Alpes Maritimes: Bulletin, 17. Section Lyonnaise: Revue Alpine, 1–3, 5–12. Section du Sud-Ouest: Bulletin, 40, 41; Catalogue de la Bibliothèque.

Club Alpino Italiano. — Direzione Centrale: Rivista Mensile, XVI. 1–11; Bollettino, 63; Catalogo della biblioteca. Sezione di Bergamo, Relazione, 1880–1896. Sezione di Brescia: Bollettino, 1874, 1875, 1896; Guida alpina Brescia, 1889; Excelsior, December, 1886. Sezione di Firenze: Notizie. Sezione di Torino: Guida delle Alpi Occidentali, I.; II. 1, 2.

Club Alpin Suisse. — Jahrbuch, XXXII., and Beilagen; Alpina, V. 1–12. Sections Romandes: L'Echo des Alpes, 1897, 1–11.

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Geological Survey of Missouri. — Report, II.; III.; IX., fol. 2–4; Coal Deposits of Missouri; Biennial Report.

Geographical Society of Philadelphia. — Map of the Arctic Regions; Charter, By-Laws, List of members; Bulletin, II. 2.

Geographische Abhandlungen, I.–V.; VI. 1.

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Instituto Geografico Argentino. — Boletin, XVIII. 4–9.

Journal of School Geography, I.

Kais-königliche Geographische Gesellschaft. — Mittheilungen, 1896.

Kruimskiĭ Gornuĭ Klub. — Zapiski, 1896, 11, 12; 1897, 1–10.

Land and Water, I.

Magyarországi Karpat-egyesület. — Jahrbuch, XX., 1893; XXIV., 1897.

Mazamas. — Mazama, I. 2.

Meehan's Monthly, VII. 7–12.

National Geographic Society. — Magazine, VIII.

New Hampshire Historical Society. — Proceedings, III.

Nederlandsch Aardrijkskundig Genootschap. — Tijdskrift, XIII. 6; XIV. 1–5; Nomina Geographica Neerlandica, II.

Norske Turistforening. — Årbog, 1897.

Nova Scotian Institute of Science. — Proceedings, IX. pt. 2.

Oesterreichischer Alpenclub. — Oesterreichische Alpen-Zeitung, 469–495.

Oesterreichischer Touristen-Club. — Oesterreichische Touristen-Zeitung, XVII. 1–24; XVIII. 1.

Revue Géographique Internationale, 252–263.

Royal Geographical Society. — The Geographical Journal, IX., X.

Scottish Mountaineering Club. — Journal, I.–III.; IV. 4; V. 1.

Siebenbürgischer Karpathenverein. — Jahrbuch, XVII.

Sierra Club. — Bulletin, II. 1, 2.

Smithsonian Institution. — Report, 1894, 1895; Mountain Observatories; International Exchange List; (Bureau of Ethnology) Report, XIV.–XVI.

Sociedad Geografica. — Boletin, XXXVIII. 7–12; XXXIX. 1–6; Rivista, 1897, 1–6.

Sociedade de Geographia. — Boletim, XVI. 1–3.

Società Alpina Friulana. — In Alto, VIII. 1–6; Catalogo della Biblioteca sociale.

Società Alpina Meridionale. — Bollettino, V. 1–4; Calendario, 1897.

Società Alpina delle Giulie. — Alpi Giulie, II. 1–6.

Società Geografica Italiana. — Bollettino, IV. 1870; V. 1870; VI. 1871; VII. 1872; VIII. 1872; IX. 1873; X. 1873; XI. 1874; XIII. 1876; XIV. 1877; XV. 1878; XXXIV. 1897; Memorie, VI. 2; VII. 1.

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Sonnblick-Verein. — Jahresbericht, V.

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Torrey Botanical Club. — Bulletin, XXIII. 12; XXIV. 1–11.

United States Department of Agriculture. — (Weather Bureau) Report N. E. Section, Climate and Crop Service; Report of Chief of Weather Bureau; Annual summary; Daily map.

United States Geological Survey. — Report, XVII. pts. 1–3; Monographs, XV.–XVIII., with Atlas to XVIII.; Bulletins, 87, 127, 130, 135–148; 32 atlas sheets.

Upsala Universitets Mineralogisk-Geologiska Institution. — Bulletin, 4, 5.

Verein für Erdkunde (Leipsic). — Mittheilungen, 1896.

White Mountain Echo, XX.

DONATIONS.

[Names of members of the Club are italicized.]

America: A Geographical History. W. B. Scaife. Gift of *J. Ritchie, Jr.*

Annual Report of the Commissioner of the General Land Office. Gift of Land Office.

Annual Report of the Park Department, City of Boston, 1896. Gift of city.

Aspidium simulatum Davenport. Geo. E. Davenport. Gift of Author.

Atlantic Monthly. 14 volumes. Gift of *Miss I. Batchelder.*

Atlantic Monthly. 90 numbers. Gift of L. R. Pearson.

Atlas of the Northwest. Gift of *W. A. Seward.*

Beauties of Nature. J. Lubbuck. Gift of *E. E. Norton.*

Botrychium ternatum Swartz, var. lunarioides. Geo. E. Davenport. Gift of Author.

Boating Trip on New England Rivers. H. P. Fellows. Gift of *E. E. Norton.*

Buckra Land (Jamaica). Alan Eric. Gift of Author.

Carpenter's Geographical Readers: Asia. Gift of the American Book Co.

Charles River from Medway Village to Newton Corner. Gift of *E. G. Chamberlain.*

Cyclopædia of Modern Travel. B. Taylor. 2 vols. Gift of *C. C. Hall.*

Elementary Geology. E. Hitchcock. Gift of *J. Ritchie, Jr.*

Elements of Botany. J. Y. Bergen. Gift of Ginn & Co.

Elements of Chemistry. *R. P. Williams.* Gift of Author.

Evidence of the Former Extension of Glacial Action on West Coast of Greenland. *Geo. H. Barton.* Gift of Author.

Farthest North. F. Nansen. Gift of the Woodstock party.

Field and Hedgerow. R. Jefferies. Gift of *T. Crozier.*

From a New England Hillside. W. Potts. Gift of *T. P. Perkins.*

Geology of the Fox Islands, Maine. George O. Smith. Gift of Author.

Geology of Pennsylvania. H. D. Rogers. Gift of Miss M. O. Rogers.

Glaciers of North America. *I. C. Russell.* Gift of Ginn & Co.

Glacial Observations in the Umanak District, Greenland. *G. H. Barton.* Gift of Author.

Glacier Bay and its Glaciers. *H. F. Reid.* Gift of Author.

Granite Monthly. 6 numbers. Gift of *E. C. Eastman.*

Greenland Icefields. G. F. Wright and W. Upham. Gift of *W. Coffin.*

Grinnell Expedition. E. K. Kane. Gift of *A. C. Fearing, Jr.*

Guide to Chamounix and the Range of Mont Blanc. *Edward Whymper.* Gift of Author.

Guide to the Study of Common Plants. V. M. Spalding. Gift of D. C. Heath & Co.

Guide to Zermatt. *Edward Whymper.* Gift of Author.

Heritage of the Trans-Alleghany Pioneers. Thomas Bruce. Gift of *J. Ritchie, Jr.*

Historic Houses and Spots in Cambridge and Near-by Towns. J. W. Freese. Gift of Miss M. A. Vinal.

I go a-Fishing. W. C. Prime. Gift of *G. D. Newcomb.*

Influence of Débris on the Flow of Glaciers. *I. C. Russell.* Gift of Author.

Issaquena. C. S. Reid. Gift of Author.

Japanese Alps. W. Weston. Gift of *R. B. Lawrence.*

Journal of a Botanical Expedition. F. Pursch. Gift of *Miss I. Batchelder.*

Journey in Brazil. Agassiz. Gift of *A. C. Fearing, Jr.*

Lakes of North America. *I. C. Russell.* Gift of Ginn & Co.

Letters from the United States, Cuba, and Canada. Amelia M. Murray. Gift of *Miss I. Batchelder.*

Lieut. Peary's Expedition. *Geo. H. Barton.* Gift of Author.

Life and Letters of William B. Rogers. Emma Rogers, editor. Gift of Editor.

List of Periodicals in the Libraries of Boston and Vicinity. Gift of Boston Public Library.

Little Rivers. H. Van Dyke. Gift of *F. V. Fuller.*

Locusts and Wild Honey. J. Burroughs. Gift of *R. B. Grover.*

Map of the Charles River from its Source to its Mouth. Surveyed and drawn by *E. G. Chamberlain.* Gift of Author.

Maine Woods. H. D. Thoreau. Gift of *T. Crozier.*

The Missouri River. J. V. Brower. Gift of *Warren Upham.*
Monte Rosa. S. H. Nichols. Gift of *Miss J. C. Clarke.*
Mushrooms and their Uses. C. H. Peck. Gift of *T. Crozier.*
New Zealand "Guide." Gift of *Miss J. C. Clarke.*
North America. Trollope. 3 vols. Gift of *J. Ritchie, Jr.*
North Carolina and its Resources. Gift of the State of North Carolina.
Northampton, the Meadow City. *F. N. Kneeland.* Gift of Author.
Our Edible Toadstools and Mushrooms. W. H. Gibson. Gift of *Cheever Newhall.*
Physical History of the Boston Basin. *W. O. Crosby.* Gift of Author.
Picturesque Franklin. Warner. Gift of *Miss I. Batchelder.*
Popular Resorts and how to reach Them. J. B. Bachelder. Gift of *T. P. Perkins.*
Practical Flora. O. R. Willis. Gift of the American Book Co.
Publications of Societies. R. R. Bowker, Ed. Gift of Editor.
Recent Achievements in Mountaineering. William M. Conway. Gift of Publishers.
Recent Rambles. C. C. Abbott. Gift of *F. V. Fuller.*
Report on the Forests of North America. C. S. Sargent. Gift of Boston Press Club.
Report of Massachusetts State Board of Health on a Metropolitan Water Supply, February, 1895. Gift of State.
Report on Mt. St. Elias. *Wm. H. Dall.* Gift of Author.
Reports of Park Commissioners of the City of Lynn, 1891, 1894. Gift of *T. P. Nichols.*
Report of the United States National Museum, 1890. Gift of *T. Crozier.*
Satchel Guide for the Vacation Tourist in Europe. Gift of Houghton, Mifflin & Co.
Scenery of Switzerland. J. Lubbuck. Gift of *E. F. Sawyer.*
Science Sketches. D. S. Jordan. Gift of *J. B. Poole.*
Story of Dog Town. C. E. Mann. Gift of Procter Bros.
Story of our Continent. N. S. Shaler. Gift of Ginn & Co.
The Arctic Problem. A. Heilprin. Gift of *Cheever Newhall.*
The Birds about us. C. C. Abbott. Gift of *A. S. Lynde.*
The Mount and Autun. P. G. Hamerton. Gift of *E. E. Norton.*
The Voice of the Valley. Y. Noguchi. Gift of *J. Ritchie, Jr.*
Through the Wilds. C. A. J. Farrar. Gift of *A. R. Bailey.*
Travels in North America. C. Lyell. Gift of *Miss I. Batchelder.*
Two Essays on Igneous Intrusions. *I. C. Russell.* Gift of Author.
Under the Southern Cross. M. M. Ballou. Gift of *C. C. Hall.*
Views from Suburban Hills. *E. G. Chamberlain.* Gift of Author.
Webster's Academic Dictionary. Gift of two members.
White Mountain Glimpses. *F. N. Kneeland.* Gift of Author.
A Woman's Ascent of the Matterhorn. *Annie S. Peck.* Gift of Author.
The Woods and Timbers of North Carolina. P. M. Hale. Gift of *J. Ritchie, Jr.*

6 Pamphlets. Gift of *Miss I. Batchelder.*
13 Pamphlets. *Geo. M. Dawson.* Gift of Author.
14 Pamphlets. Gift of B. E. Fernow.
9 Pamphlets. *Jules Marcou.* Gift of Author.
5 Pamphlets. *A. S. Packard, Jr.* Gift of Author.
30 Park Reserve Proclamations. Gift of President of the United States.

Alpinismo. G. Brocherel. Gift of G. Sinigaglia.
Antecedentes Administrativos de Correos y Teligrafos. Gift of Office, Buenos Aires.
Dizionario Alpino Italiano. Gift of G. Sinigaglia.
Guida alla Valtellina. Gift of G. Sinigaglia.
Guida Alpina di Brescia. Gift of G. Sinigaglia.
In Val Grosina. Giorgio Sinigaglia. Gift of Author.
Irlande. *E. A. Martel.* Gift of Author.
Nelle Dolomiti di Ampezzo. Leone Sinigaglia. Gift of Author.
Ricordi Alpini delle Dolomiti (1893). Leone Sinigaglia. Gift of Author.
Ricordo di una Gita al Monte Rosa. N. Fatichi. Gift of Author.
6 Pamphlets. F. Gonella. Gift of Author.
4 Pamphlets. E. A. Martel and Aline Martel. Gift of Authors.

PURCHASED.

An Artist in the Himalayas. A. D. McCormick.
Camping in the Canadian Rockies. W. D. Wilcox.
Climbing in the Dolomites. L. Sinigaglia.
Climbs in the New Zealand Alps. E. A. Fitzgerald.
Expedition of Lewis and Clarke. Allen. 2 vols.
Expedition to the Rocky Mountains. Major Long.
Expedition from Pittsburgh to the Rocky Mountains. Edwin James, editor.
Flora of the State of New York.
Fresh Fields. J. Burroughs.
Friendship of Nature. Mabel Osgood Wright.
Geographical Studies. C. Ritter.
Missouri. Third Annual Report of Missouri Botanical Garden.
Notes on the Algæ of the United States. J. W. Bailey.
Story of the Birds. J. N. Baskett.
Switzerland of America. S. Bowles.
Travels in a Treetop. C. C. Abbott.
Volcanoes : Past and Present. E. Hull.
Whittier's Poems.
14 Pamphlets.

Treasurer's Report for 1897.

Two items only of the accompanying report seem to require a word of comment. The first is that of room rent.

The Club having had a full year in the rooms in Tremont Building, a comparison can be made of the cost with that of our former quarters in the Ticknor Mansion in Park Street. We paid in 1897 $1260 for the new rooms. The average cost in the Ticknor Mansion for ten years was $520 per year. The advantages of the room, the convenience of location, the better arrangements for committees, for the library, and for meetings prove the wisdom of the change, notwithstanding the increased cost. This increase has been nearly met by liberal subscriptions and by a general acceptance of keys by local members, at an annual charge of one dollar. The payment for subscriptions and use of keys has amounted to $443.50 for the first year. Of this amount $122 was paid in the fall of 1896, and $321.50 in the year 1897; prepayment of subscription has also been made to the amount of $124, which is held as a Fund for use in following years.

The other large item of expense during the year is for the Guide-book, of which a few words must be said in order to explain a new item which has come into the accounts, viz., the Temporary Loan. The first edition is completed and paid for, and we are able to determine clearly our financial status with regard to this work, which for the past four years has received appropriations from the treasury. The payments on it in 1897 were $1935, and the receipts by sales and advertisements $1159; the deficit has all been cared for from the Club treasury with the exception of $250: this could have been drawn from the Reserve Fund, but the Council thought it best to borrow the money temporarily rather than disturb the investment of the Fund.

RECEIPTS.

Cash on hand, Jan. 1, 1897		$237.98
Life-Memberships: Albert Matthews, John C. Olmsted, M. L. Delafield, Jr., Susanna Saunderson, Charles H. Sanders, 5 at $30		150.00
Trustees of the Reserve Fund:		
For amount withdrawn from the Fund		200.00
Temporary Loan:		
For amount borrowed		250.00
Admission Fees:		
From 130 new members at $5	$650.00	

Assessments:			
From 6 members for 1896			
" 698 " " 1897			
" 5 " " 1898			
709 members at $3		2127.00	
Interest:			
On Permanent Fund for 1896	$147.18		
" Reserve Fund " "	71.76		
" " " " 1897 (part)	16.82		
" Treasurer's accounts	15.72		
		251.48	
APPALACHIA and other publications:			
For sales of APPALACHIA in 1896	$1.50		
" " " maps in 1896	13.55		
" " " APPALACHIA in 1897	14.30		
" " " maps in 1897	1.30		
" " " "Walks & Rides about Boston"	1099.12		
" Advertisements in do.	59.75		
		1189.52	
Donations:			
For APPALACHIA, VIII., 2, from A. L. Rotch	$10.00		
" Periodicals, from Mrs. J. H. Thorndike	10.00		
" Library	23.68		
" Room	321.50		
" Memorial to Charles Eliot	86.00		
		451.18	
Sella Collection:			
Sale of Catalogues at Portland, Ore.		8.35	
Room:			
For Meetings and Reunions		17.00	
Field Meetings and Excursions:			
For amount received from the Committee		155.00	
Total Income			4849.53
			$5687.51

PAYMENTS.

Trustees of the Permanent Fund,			
For 5 Life-Memberships			$150.00
Postage and stationery		$240.80	
Printing and advertising	$150.35		
For Club Register for 1897	115.00		
		265.35	
Clerical services:		258.50	
Expenses of meetings	$136.30		
For meetings at Club Room	28.58		
		164.88	

Library:			
For books	$72.02		
" binding	70.08		
		142.10	
Room:			
For rent, 1049–51 Tremont Bldg., & care	$1127.04		
" storage	23.35		
" light	21.29		
" fittings	48.50		
" furniture	17.99		
" supplies	22.49		
		1260.66	
APPALACHIA and other publications:			
For Vol. VIII., No. 2	$00.75		
" Vol. VIII., No. 3	433.12		
" Delivery, do.	55.00		
" Expense, business agent	50.00		
" "Walks and Rides about Boston"	1935.10		
		2473.97	
Department of Exploration:			
For exploring in Canadian Rockies		17.50	
Department of Improvements:			
For paths		130.77	
Department of Natural History:			
For botanical supplies		.90	
Department of Art:			
For photographs and mounting	$28.21		
" Sella Collection Catalogues	50.00		
		78.21	
Donation to Trustees of Public Reservations		25.00	
Real estate:			
For expenses		239.55	
Annual Reception:			
For deficit		6.25	
Total expenses			$5304.44
			$5454.44
Cash on hand, Dec. 31, 1897		$23.07	
Room-fund (prepayment of subscriptions)		124.00	
Eliot Memorial Fund		86.00	233.07
			$5687.51

Respectfully submitted,

JOHN E. ALDEN,

Treasurer.

The Committee appointed to examine the accounts of the Appalachian Mountain Club, respectfully report: —

We have examined the accounts of the Treasurer for the year 1897, and believe them to be correct. Proper vouchers were shown for all payments, and the cash on hand was verified, amounting to two hundred and thirty-three dollars and seven cents.

We have examined the account of the Trustees of the Permanent and Reserve Funds, and find it to be correct.

The Permanent Fund amounts to four thousand and thirty-three dollars and ninety-five cents ($4033.95), and the accumulated interest on it on hand is one hundred and fifty dollars and thirty-seven cents ($150.37), total $4184.32.

The Reserve Fund amounts to eleven hundred and twenty-three dollars and nineteen cents ($1123.19), and the accrued interest on it on hand is thirty-one dollars and ten cents ($31.10), total $1154.29.

The investments, as reported by the Trustees, have been verified.

Respectfully submitted.

Cheever Newhall, } *Auditing*
Ernest N. Boyden, } *Committee.*

Boston, January 11, 1898.

Report of the Trustees of the Permanent Funds for the Year 1897.

Permanent Fund. — Principal.

1897.			
Jan. 13.	Amount of Permanent Fund on hand per last account		$3883.95
"	Amount of Interest on hand per last account	$147.18	
April 26.	Paid J. E. Alden, Treasurer, accrued interest of the year 1896, as per vote of the Council	147.18	
Amounts received from J. E. Alden, Treasurer, for Life-Memberships during year :			
April 14.	Albert Matthews	30.00	
June 23.	John C. Olmsted	30.00	
Dec. 7.	Maturin L. Delafield, Jr.	30.00	
" "	Miss Susanna Saunderson	30.00	
" 24.	Charles H. Sanders	30.00	
			150.00
	Total Principal on hand Jan. 12, 1898		$4033.95

Permanent Fund. — Interest.

1898.		
Jan. 1.	Suffolk Savings Bank: 12 months, to October, 1897, at 3½%	$55.94
	Provident Institution for Savings: 12 months, to July, 1897, at 3½%	43.20

	Lexington Savings Bank: 12 months, to October, 1897, at 4½%		42.91	
	Eliot Five Cents Savings Bank: 12 months, to October, 1897, at 4%		6.82	
	Canton Institution for Savings: 12 months, to October, 1897, at 4%		1.50	
	Total interest accrued during year			150.37
" 12.	Total Permanent Fund, Principal and Interest			$4184.32
	This is deposited in —			
	Suffolk Savings Bank, Book No. 100,753		$1652.38	
	Provident Institution for Savings, Book No. 118,265		1267.51	
	Lexington Savings Bank, Book No. 1921		920.95	
	Eliot Five Cents Savings Bank, Book No. 32,233		191.68	
	Canton Institution for Savings, Book No. 9015		151.80	
				$4184.32

RESERVE FUND. — PRINCIPAL.

1897.				
Jan. 13.	Amount of Reserve Fund on hand, per last account			$1323.19
" "	Amount of Interest on hand per last account		71.76	
" 14.	Paid J. E. Alden, Treasurer, part of accrued interest of year 1896	$39.08		
April 17.	Paid J. E. Alden, Treasurer, balance of accrued interest of year 1896, as per vote of the Council	32.68		
			71.76	
Aug. 9.	Paid J. E. Alden, Treasurer, on account, as per vote of Council, Feb. 11 and March 11, 1895, to appropriate from Reserve Fund $500, to be used by the Trustees of Real Estate, in purchases of land for the Club			200.00
	Total Principal on hand Jan. 12, 1898			$1123.19

RESERVE FUND. — INTEREST.

1898.			
Jan. 1.	Boston Five Cents Savings Bank: 12 months, to October, 1897, at 4%	$33.00	
	Massachusetts Loan and Trust Co.: 12 months, to January 1, 1898, at 3%	14.92	
		47.92	

1897.			
April 17.	Paid J. E. Alden, Treasurer, part of interest of 1897	16.82	
1898.			
Jan. 12.	Accrued interest of 1897, on hand		31.10
	Total Reserve Fund, Principal and Interest.		$1154.29
	This is deposited in —		
	Boston Five Cents Savings Bank, Book No. 229,173	$825.18	
	Massachusetts Loan and Trust Co.	329.11	
			1154.29
	Total Permanent Fund, Principal and Interest	$4184.32	
	Total Reserve Fund, Principal and Interest.	1154.29	
	Total amount in the hands of the Trustees		$5338.61

ISAAC Y. CHUBBUCK,
REST F. CURTIS,
CHARLES H. FRENCH,
Trustees of Permanent and Reserve Funds.

BOSTON, *January* 12, 1898.

Report of the Trustees of Real Estate.

SINCE the last annual meeting the Club has acquired two pieces of real estate: the first, January 21, 1897, by gift of Miss Anne Whitney, being about twelve acres in the town of Shelburne and State of New Hampshire upon the southern bank of the Androscoggin River, adjacent to the Lead Mine Bridge, and commanding the magnificent view of Mts. Madison and Adams, well known to the public especially through Starr King's "White Hills;" and the second, December 21, 1897, by gift of Mr. Albert Stevens Parsons and his relatives, the heirs of the late Maria M. Stevens of the town of Warwick in this Commonwealth, being about forty acres in said town, and including a portion of Mount Grace. Warwick is near the New Hampshire boundary and about ten miles east from the Connecticut River. The Club land does not include the principal summit of the mountain, 1628 feet high, but does include the northern peak, 1490 feet high, which is much more attractive in shape, and commands a wider prospect, including Mts. Greylock, Monadnock, and Wachusett, and the beautiful Sunny Valley reaching to the north from the foot of the mountain towards Winchester.

Near the boundary line of and partly upon its land in Randolph, at the foot of Mt. Adams, the Club had a most successful and enjoyable camping party for two weeks in August under the leadership of Mr. Lawrence; thus affording to many for the first time an acquaintance with the work which has been done in the improvement and preservation of this portion of our property.

It is hoped that the interest in forest preservation shown in so practical a way by these first benefactors, becoming known to others equally desirous of preserving the natural beauty of New England to last generations, will result year by year in rapidly increasing donations; in which event it will not be long before the Club will be generally recognized as the natural custodian of wild and forest lands to be held in perpetuity for the benefit of the public.

During the Field Meeting in the Profile House it was urged by the Forestry Commissioners of New Hampshire that the Club should solicit subscriptions to a very large amount for the purchase of lands in what are known as the Thompson and Meserve Purchase and the Sargent Purchase, including a part of the Presidential range, the Mt. Alban range, and the Mt. Washington River valley; but the proposal was accompanied by undesirable conditions, upon which account, and for other reasons, we did not consider it advisable to undertake the enterprise.

Among the expenses of the year are the sum of $25 for the clearing away of fallen wood upon the Randolph land near the line of the railroad as a safeguard against fire, and the sum of $213.41 for the fencing and reclaiming of the Shelburne land.

HARVEY N. SHEPARD,
CHARLES E. FAY,
J. RAYNER EDMANDS,
A. E. SCOTT,
PARKER B. FIELD,

Trustees of Real Estate.

Reports of the Councillors for the Autumn of 1897.

Topography.

By Louis F. Cutter.

The work of the Department of Topography has been lighter in the year just past than in the two preceding years, owing to the completion of the topographic work connected with the publication of the Boston Map and the Guide-Book. The Councillor, however, has continued his own work of mapping the northern slopes of Madison, Adams, and Jefferson, and has made progress in it. It was sufficiently advanced at the beginning of the season to be of service in compiling the map issued by the Department for the use of the August camping party. Mr. Lawrence, in May, suggested the making of such a map for the use of the members of the camping party which he intended to lead. One was accordingly compiled from all sources of information then available. It is entitled "Sketch Map of Paths on the Northern Slopes of Madison, Adams, and Jefferson, drawn for the Use of Camping Party, August, 1897." The scale is about 1 : 30,000, and the contour interval about 100 ft. The principal sources of information were as follows: —

Louis (F.) Cutter, Map of Durand Ridge and Kings Ravine, 1885.

W. G. Nowell, Sketch-map of Paths near Mt. Adams, 1888.

W. H. Lovell, Mt. Washington (N. H.) Sheet, U. S. Geol. Survey, 1891.

Louis F. Cutter, Map of Northern Slopes of Madison, Adams, and Jefferson (unfinished), 1896–97.

Measurements and Sketches by Mr. E. B. Cook, Mr. W. H. Peek, and Mr. J. R. Edmands.

The price of the blue-print copies of this map was fixed at 25 cents, and they were sold to members of the camping party and to others who wished to have them. In all, 107 copies were sold, bringing in $26.75. The expense for blue-printing, express, and postage was $11.70, leaving a profit to the Club of $15.05. The thanks of the Department are due to Mr. Frank Chase, clerk of the Ravine House, who, without remuneration, took charge of the sale of the maps.

In August and September further progress was made on the "Map of the Northern Slopes," and it was thought worth while to make a new tracing from which blue prints could be taken. This has been done, and the revised map will soon be ready for distribution.

Other topographical work done by members of the Club is as follows: —

In August Messrs. H. C. Parker and C. S. Thompson started to carry out the work contemplated by Mr. P. S. Abbot, in 1896, namely, the exploration and mapping of a large snow field in the Canadian Rockies. The Councillor is informed that, in coöperation with Mr. George P. Baker of the English Alpine Club, an interesting survey was made, the results of which are to be presented to the Royal Geographical Society, and doubtless to our Club.

In 1896, Mr. E. G. Chamberlain continued his survey of the Charles River. He also determined, by several three-point observations, the geodetic coördinates of a point on the southwest window-sill of the Club room. He found its position to be lat. 42° 21′ 27.82″, long. 71° 03′ 41.74″.

In 1897 Mr. Chamberlain continued, and nearly finished his survey of the Charles River, and blue-printed it in nineteen sheets of twelve by eighteen inches, each showing about five miles of the stream on a scale of 1 : 12,000, and a twentieth sheet showing the entire river on a scale of about two miles to an inch. The following is quoted from a letter from Mr. Chamberlain, dated November 10, 1897: —

> "I am now prepared to answer two questions I have often been asked: How long is Charles River? Where does it rise? It rises in Hopkinton about one mile south of the Center Village square, about 400 feet east of Hayden Row Street, nearly opposite to the Honey Hill School-house, in a wet hollow a few rods square. . . . I assume the mouth to be opposite the south corner of the Navy Yard. The distance in air line is 25.8 miles. The distance measured in mid-stream through all the windings is 85.7 miles (+ ?). There are many dams causing mill ponds in the meadows, but in nearly every case I have been there at low water and mapped the stream."

Mr. Chamberlain has also been engaged in making panoramic guides to the views from Arlington Heights and from the Bear

Hill observatory. Though still unfinished, these are blueprinted and furnished to members of the Club who wish to use them.

Late in the year the Department of Topography was authorized by vote of the Council to begin a new map of New England to show the position of the mountain summits. This map is intended to take the place of a similar map issued by the Club several years ago, which was found to be inaccurate and withdrawn from sale. The present Councillor has not been able to do anything towards this work, which will therefore fall wholly to his successor.

The topographic event of the past year which will most directly affect the members of this Club is probably the change in the manner of distributing the atlas sheets and other maps of the United States Geological Survey. The following is quoted from a circular issued by the survey: —

> "By Congressional enactment, approved February 18, 1897, the topographic and geologic maps and atlases of the United States made and published by the Geological Survey must be disposed of through sale. . . . *They will be sold at the rate of five cents per sheet.* Orders for *one hundred sheets* or over, whether for the same or different sheets, will be sold at the rate of two cents per sheet. Proportional charges will be made for the larger size and special maps. . . . Lists of maps and folios and other publications of the Survey will be furnished on application."

In this connection it may be mentioned that the Massachusetts Topographical Survey Commission has reduced the price of its atlas sheets. The work of this commission has been put in charge of Mr. H. B. Wood. Mr. Wood has had an extensive experience in topographic work in the survey of the Mississippi River. He is a member of this Club.

Reports of the Councillors for the Autumn of 1897.

Art.

BY HELEN E. ENDICOTT.

DURING the past year your Councillor has added to the photo-
urchase of a series of English Lake

Country views, and a large number of photographs taken in the Highest Sierra by Mr. T. S. Solomons. The Sierra photographs and a considerable quantity of unmounted material on hand at the beginning of the year have been arranged and mounted in albums. We have received from Signor Sella a gift of his latest Caucasian views, which have also been mounted, and from Mr. Harry Fielding Reid a collection of Alpine views.

Mr. William H. Peek has presented to the Club two framed water-colors, painted by himself, — one of Huntington's Ravine, the other of the Pond of Safety. These have been hung upon the walls of the Club room. A view of the Great Range (White Mountains), taken and presented by Mr. Charles E. Lord, a photograph of Zurbriggan, the guide who was with Conway in the Himalaya, and with Fitzgerald on Aconcagua, presented by Signor Sinigaglia; and a photograph of the view from our windows, taken and presented by Mr. Parker B. Field, have also been placed in the Club room.

In accordance with a plan to form a collection of Mount Desert photographs, Dr. James S. Thorndike and Mr. Parker B. Field have given a large number of mountain and seashore views, taken during the Field Meeting of 1895, and additional pictures of the same region are promised by other members of the Club. We have also received from Mr. Charles F. Peirce the offer of a number of Adirondack views, as the nucleus of a collection for that region.

Several exhibitions have been held during the year. In January, at the "at home" of the Room Committee, water-colors of White Mountain scenery by Mr. Walter L. Chaloner, and of Greenland by Mr. R. W. Porter, and photographs of the Moon, the property of Mr. John Ritchie, Jr., were loaned by them, and exhibited at the Club room. In February, photographs loaned by members and friends of the Club were exhibited as usual in connection with the Annual Reception. Photographs by Mr. William Coffin and Mr. Charles Dawson, loaned for this occasion, were presented by them to the Club; Dr. Ralph C. Larrabee's loan of winter views in the White Mountains was exhibited during the following week at the Club room. Exhibitions were also made at the two succeeding receptions of the Room Committee. In May, Mr. Charles Pollock placed at our disposal for exhibition all of his mountain photographs; a panoramic view of the Muir Glacier, presented to the Club by the Great Northern Railroad, and several photographs loaned by the same, were also exhibited.

At the October reception were shown the new groups of Sella photographs, and the Harvard Geographical Models, loaned by Professor William M. Davis.

REPORT OF THE COMMITTEE ON THE SELLA COLLECTION.

When the Committee made its last annual report, the Sella Collection was in the custody of the Jervis Library at Rome, N. Y., awaiting the conclusion of negotiations looking to its exhibition in Western cities. In the latter part of March it was forwarded to Cleveland, Ohio, at the request of the librarian of the Case Library of that city, and exhibited under its auspices for some two weeks.

Early in May it was sent to Portland, Oregon, to be exhibited by the "Mazamas," and was for many weeks the object of widespread interest in that mountaineering centre. The City Council placed at the disposition of the society a suite of five rooms in the City Hall, in which, after the collection was provided for, space was allotted to local photographers for their mountain views. From exhibits thus made, many fine photographs of the scenery of the Pacific States have been presented to our Club "as some slight return for the loan of the Sella views." It may be reported as an interesting circumstance in this connection that Signor Sella himself visited this exhibition at the request of the Committee in charge, while passing through Portland on his way to Mt. St. Elias.

In October the collection was forwarded to San Francisco, where it was exhibited for ten days under the auspices of the Sierra Club. The exhibition was visited by some 1360 persons, and was highly appreciated, as we are informed by the Secretary of the Club.

In December it was shipped to Denver, where an exhibition is probably now being given jointly by the Artists' Club and the recently formed Rocky Mountain Club. From Denver it will be transferred to the Department of Geology at the University of Chicago for an exhibition in the Walker Museum of that institution. Arrangements are pending for still other exhibits in cities of the middle West.

Several letters of inquiry, expressing a wish for a loan of the collection, have been received from libraries in the Eastern States. Such are on file from the public libraries of Newark, N. J., and from Salem, Medford, Watertown, and Westford, Mass.

An additional contribution of his last series of Caucasian views was received from Signor Sella early in the summer.

An edition of the catalogue, one thousand copies, was printed from the plates during the autumn, which will supply the probable demand for some time.

Respectfully submitted,

CHARLES E. FAY, } *Committee*
H. E. ENDICOTT, } *on the*
W. O. WITHERELL, } *Sella Collection.*

Reports of the Councillors for the Autumn of 1897.

Exploration.

BY PARKER B. FIELD.

JOINING hands with our English neighbors our Club has been able, during the past season, to see in the field of exploration in British Columbia and vicinity the strongest party which has yet visited those Alpine fastnesses for the purpose of exploration and high ascents.

Work of the most satisfactory nature has been accomplished, the most important being the ascent to the summit of Mt. Lefroy and of Mt. Victoria, and the collating of material for a map of the Waputehk region.

Those representatives of our own Club engaged in this work were Professors C. E. Fay and A. Michael, Rev. C. L. Noyes, Messrs. C. S. Thompson and H. C. Parker. Mr. J. R. Van Derlip, of Minneapolis, was also with the party. The English Alpine Club was represented by Dr. J. N. Collie, Professor H. B. Dixon, and Mr. G. P. Baker, who brought to the party the services of the expert Swiss guide Peter Sarbach.

The entire work of the season will in all probability be presented in special papers before the Club and published in APPALACHIA; nevertheless the following summary furnished by a member of the party may appropriately be incorporated with this report: —

"Before undertaking the more important work, some preliminary climbs about the Glacier House were planned.

"On July 27, a first ascent of The Dome was made, from the east over a snow arête, and then by a chimney, — a very interesting climb of at least moderate difficulty.

"Two days later the summits of Mts. Castor and Pollux were reached. The former had been climbed by the Club party of 1895, but, for the latter, this was a first ascent. The route of ascent, so far as is known, was new. It lay over the moraine which bears westerly from the Asulkan glacier, and then — as the party was forced by crevesses over to the base of the 'mittelgrat' which descends between The Dome and The Rampart, — under the base of The Dome to the 'Col of the Emerald Pool.' From here to Castor the route of 1895 was taken. The passage across the col from Castor to Pollux offered no difficulty and was made in a leisurely way in 30 minutes. Pollux proved by the aneroid to be 5971 feet above the Glacier House, and some 60 feet higher than Castor. Descent was made from the snow field back of Pollux by the route of the party of 1895. The party left the Glacier House at 3.05 A. M., arrived on the summit of Castor at 10.40 A. M., left Pollux at 12.20 P. M., the level of the Asulkan Pass at 2.10 P. M., and the end of the glacier at 2.30 P. M.

"On August 3, a party of nine left the chalet at 3 A. M., reached Abbot Pass at about 8 o'clock and stood upon the summit of Mt. Lefroy at 11 A. M. As the snow was in perfect condition, a direct route was followed from the Pass, upon the exact line of watershed. The barometer indicated at the summit an altitude of 11,400 feet.

"In 1896 the hitherto unscaled Mt. Victoria (Mt. Green) was pronounced by Mr. Abbot, of the Club party, as probably accessible by a route from the pass which now bears his name, and by this route it was this year ascended. A party consisting of Messrs. Collie, Michael, and Fay, with the guide Sarbach, left the chalet on August 5 at 3.30 A. M., and arrived at Abbot Pass at 7.25. The end of the principal grat was reached at 9.50, and the summit at 11.45, where the barometer gave an altitude of 11,500 feet. The return was begun at 12.15 P. M. and, 35 minutes having been taken for lunch, Abbot Pass was reached at 2.55 P. M.

"On August 7 start was made for the Bow Lakes, and an exploration of the Waputehk Glacier. The 8th was passed in camp near the lower lake, a party of three merely going up the west shore of the lake about three fourths its length for plane-table work. Before returning, the course of a torrent was followed up toward the opening of a fine amphitheatre, and the party made what they suppose to be the first visit ever paid to a pretty lake, which they christened 'Lake Margaret.' On the 9th the camp was advanced to near the foot of the Upper Bow Lake, some twelve to fifteen miles, from which the snow field was attacked on the 10th by way of a fine glacier (fully as large as that of the Illicilliwaet) lying west of the head of the lake. After having covered perhaps eight miles from camp, of which more than half was upon ice and névé, the party at 2 P. M. reached a summit over 10,000 feet high, which they have named Mt. Gordon, from the family name of the Earl of Aberdeen, Governor-General of Canada. It lies next north of Mt. Balfour on the Continental Divide, and some two or three miles from it. The return was made over a fine snowy dome lying about one mile farther north and forming a second summit of the same mass. Camp was reached about 7.30.

"The 11th was spent in returning to the camp on the Lower Bow Lake. On the 12th, had the weather favored, Mt. Balfour would have been the goal of the party; but snow during the night made it seem injudicious to attempt a high ascent, so a very interesting reconnoissance was made. The lake was skirted by its western shore, and the torrent followed to the foot of the large triple glacier which descends by the western valley, keeping first on the southern moraine; hence up the rocky wall to a névé basin recently abandoned by the snow, and then rising to where the snow began again, and on it for perhaps a mile, then, turning to the left and descending through an amphitheatre to the Lower Bow Lake, passing on the way a glacial lake of rare beauty, some 800 or 1000 feet above 'Lake Margaret,' and afterward 'Lake Margaret' itself. On the 13th the party returned to Laggan."

This region will for some time present almost unlimited possibilities for explorational work, and it is hoped that our Club members will continue this active interest in the promotion of geographical research among its mountains and glaciers.

Reports of the Councillors for the Autumn of 1897.

Improvements.

By Frederic Endicott.

Of the Club paths on Mt. Adams, some, as in former years, have been repaired by Mr. V. D. Lowe, and some by Mr. L. M. Watson, the removal of fallen trees being all that was needed. In December, 1896, the Council accepted the path to the Pond of Safety as a Club path, and it was cut out in June.

The paths to Carter Notch from Jackson and from the Glen House are said to be in very poor condition, but no reports of this reached the Councillor till late in the season. The one from Jackson is obscured by crossing many lumber roads, and is somewhat blocked by windfalls. One guide-board was placed on this path early in October, but a number more are needed. The path from the Glen House needs much repairing. The Carter Notch Camp also needs renovation.

The Livermore-Waterville path is in good condition from Waterville to the height of land, but from that point easterly, Mr. Goodrich, the president of the Waterville Athletic Association, thinks that it would be advantageous to so relocate it as to abandon the old logging road and decayed corduroy between the height of land and camp No. 6 on the lumber railroad. The Waterville path up Black Mountain (Sandwich Dome) was damaged last winter by lumbering operations. This has been cleared by the Athletic Association at an expense of eight dollars, and the club has repaid this amount according to the agreement with them as in previous years.

At the suggestion of the Excursion Committee, and in anticipation of the Field Meeting at the Profile House, the Councillor of Improvements, with Mr. Franklin P. Clark, of Franconia, and Mr. W. R. Davis, laid out in June last a path from the Gale River Bridge of the Profile & Franconia Notch Railroad to the top of Mt. Garfield. This path was soon after cut out by Mr. Clark, and provided one day's exercise for a large party. It follows a logging road up the banks of a stream which rises at a point where the northeasterly side of the mountain joins a ridge running towards the Twin Mountain range. The logging road ends a little below the top of this ridge, the path continuing in the same general direction to the top of the ridge. At this point it turns to the right at about a right angle, and soon strikes a very steep ascent, at the foot of which ice was found among the rocks. From the top of this steep portion (which, however, is short) the general course is southwesterly to the summit. This path can easily be kept open, and after a few years, when the new growth has attained some size, will make a comfortable way to a mountain nearly surrounded by higher summits.

Another path for the use of the Field Meeting was spotted from the end of a lumber road to the summit of Mt. Kinsman, but owing to the heat and to rain on the last two days of the meeting it was not used.

Late in the season the Lafayette Liberty path was cut out by Mr. Clark, and also a direct path from Little Haystack to Liberty. The path from Mt. Liberty to the Flume House was not repaired, as it can be of no use until lumbering is finished in that vicinity. The old path to Mt. Lafayette has also been cut out from its junction with the Profile House path down to a lumber road which leads to the public road. This considerably shortens the distance from North Woodstock to this summit.

Nothing has been done on the Twin Mountain path, but as lumbering is now finished in that region and the saw mill is burned, it might be well to reopen it. The Carrigain path will need cutting out next summer.

The following record rolls have been replaced by new ones: Mt. Marcy, by Miss M. G. Porter; Mt. Lowell, by Mr. J. S. Pray; Mt. Osceola, by Mr. G. W. Field; and Mt. Madison, by the August camping party, who also replaced the register in the Madison Hut. The roll on Mt. Lowell was found to be much damaged by water.

A new cylinder and roll were placed on South Tripyramid by Mr. W. R. Davis, and on Mt. Garfield by the excursion from the Field Meeting. No roll was found on Mt. Tremont by Mr. Pray, but he placed there several sheets of paper for a record in a tight jar. The cylinders and rolls on Mt. Liberty and Moat Mountain appear to have been missing for several years.

Report of the Room Committee.

The Club has completed the first year of its occupancy of the new rooms, and it is a pleasure to the Committee to be able to report that the members seem to be greatly pleased with them, and exhibit their interest by frequent visits. The beautiful views and the delightful sunsets have not lost their attractiveness, and many of the members in taking their friends about the city do not think the circuit complete without a peep from our windows. The rooms have been open on the afternoons of week days throughout the year under the care of volunteer custodians, and the attendance has averaged five or six times that at the room on Park Street. The display of the library and the comfortable nooks which the rooms supply for conversation and reading are attractive features, and there are many who drop in during the quiet mornings to glance over the newest book or the most recent alpine journal or geographical magazine.

The "at homes" of the Room Committee have been a very successful social feature rendered possible by the new rooms, and have added no little to their popularity. While contributing to the better acquaintance of those who are already Club members, they also favor the acquisition of new ones. On these occasions the rooms are open during the afternoon and evening, some special exhibition, as of paintings or mountain photographs, of models or arctic relics, is provided, together with a modest collation. As many as three or four hundred persons, half of them members of the Club, have attended a single "at home." The features exhibited at them are noted in detail in the report of the Councillor of Art.

The rooms have also been used for meetings of the Snow Shoe Section and for the reunions of the members of the various Club excursions; many committee meetings and other smaller gatherings have been held in them. The use of them has also been tendered to the Mycological Club, which includes many of our Club members.

John Ritchie, Jr.,
Isabel Batchelder,
Helen E. Endicott,
Agnes W. Lincoln,
Delia D. Thorndike,
Committee on the Club Rooms.

Report of the Excursion Committee for 1897.

The Committee, at the time of their organization, agreed that they would best serve the Club in cultivating "an interest in geographical studies," and stimulating a fondness for outdoor life by arranging, when expedient, as many excursions and outings as the popular demand of the members should call for, as far as possible planning trips which would have some peculiar historical, geological, or other interest. They consequently arranged both an excursion and an all-day outing for as many holidays as possible, and the members of the Club have been offered more excursions and outings than for a number of years.

That this plan has been acceptable to the members is shown by the fact that the total number of participants has been 2051, the largest number for five years. There have been seven excursions with an average attendance of sixty, seven all-day outings averaging sixty-six on each, and thirty-four half-day outings with an average of thirty-four participants. Two all-day and four half-day outings were abandoned on account of unfavorable weather.

In the spring the Committee requested, through the monthly circular, that members send to our Secretary notes of any features of unusual interest that may have impressed them while upon the walks, but few responses have been received.

EXCURSIONS.

The first excursion of the year was to WOODSTOCK, VT., from February 20 to March 1, and was, as usual, under the auspices of the Snow-shoe Section, and conducted by Messrs. R. B. Lawrence and W. R. Davis. A party of fifty left Boston on February 20 at 9 A. M., arrived at Woodstock at 3 P. M., and took up quarters at the Woodstock Inn. On the morning of the 21st, thirty-eight ascended Mt. Tom, and in the afternoon forty-seven drove to Quechee Gulf. On the 22d (Washington's Birthday) forty-three drove to KILLINGTON PEAK, and thirty-six of this number reached the summit. On the 23d short walks were taken to Baylie's and Lockwood hills. A trip to MT. ASCUTNEY was arranged for the 24th, when thirty-five drove to Allen Dudley's, at the base, and twenty-five snow-shoed to the top. A trip to Blake's Hill and a "camp-fire" in a ravine occupied the 25th. On the 26th the Lakota Club extended an invitation to visit their camp, and thirty-nine were of the party. There was general snow-shoeing on the 27th and a "camp-fire" near the Hartland road. On the 28th twenty drove to Garvin Hill, returning to the hotel on foot. March 1 was the date of the return to Boston. The total number on the excursion was sixty-four.

AMHERST, MASS., extended its hospitality from May 28 to June 2, to a party under the leadership of Mr. John Ritchie, Jr. The participants in the excursion reached the place of meeting in a rather straggling way, twelve going at noon on Friday, according to the official program, fifteen going from Boston by later trains, and four reaching Amherst direct from Philadelphia. Local members and friends, to the number of ten, were present on one or more of the trips, so that the whole number taking part in the excursion was forty-one. The principal walking feature of the excursion was a trip over the summits of the HOLYOKE RANGE, from the Notch to the Prospect House. Twenty-one members left Amherst in a tally-ho, and at the Notch the walkers, to the number of eleven, alighted. The others continued the drive and waited for the walkers at the Prospect House. The whole distance walked was about nine miles, and the time about six hours. Some twenty summits were counted, the spaces between them being wild country, and the notches were often wide and deep. The next day a party of nine, which had been too late for the walk, repeated a portion of it, the object of the trip being botanical. The weather on Monday morning was not propitious, so but few went for a tramp. The others devoted their time in the forenoon to the Agricultural College, where President Goodell placed himself at the disposal of the visitors, and accompanied them through the many buildings. In the afternoon Amherst College was visited, Professor B. K. Emerson throwing open the cabinets of geology and mineralogy, and Professor D. P. Todd showing the observatory and laboratories. Tuesday was devoted to the Swift River walk, in which six of the party joined. The trip was by train to Greenwich village, thence by the roads over Prescott and Pelham hills to Pelham; thence by wood road to the summit of MT. LINCOLN, a trip which gave charming views of a little-visited country. Seven others drove in the afternoon to Mt. Lincoln, the two groups returning together. On Wednesday a party of four spent the day on the summit of MT. TOBY, and among its grand rocks and ravines. The party returned to Boston in much the same order as it went. The Club is much indebted to Professor S. T. Maynard, a local member, for courtesies shown the party. At different times he entertained groups of the members, explaining to them the nature of his work in the plant houses and in horticulture. Professors C. H. Fernald and G. E. Stone also extended especial courtesies, conducting the visitors through the insectary and explaining the methods of warfare against the gypsy moth and other noxious insects.

DUBLIN, N. H., was visited from June 16 to 21 by a party led by Mr. Parker B. Field. On Wednesday fifty members and friends took train to Harrisville, and from there drove to Dublin, arriving at The Leffingwell in time for a late dinner. Others here joined the party until the whole number participating in the excursion was fifty-eight. Thursday was a beautiful, fresh, cool day and thirty-five of the party were driven four miles to the Dublin path up MT. MONADNOCK. Of these, eleven remained on the side of the mountain at various elevations, until the return of the party from the summit, and twenty-four walked the easy two miles to the top. The atmosphere was fairly clear, the view extending as far north as Mt. Ascutney and southern Kearsarge. After two hours on the summit the party started down, seven retracing their steps to the wagons, and seventeen, including four who had previously gone down to Echo Point, on the southerly side, walked home to Dublin over the long easterly ridge of the mountain. On Friday, sunny and warm, a party of forty-eight drove to Peterboro. A few remained there for dinner, while the main party continued to the base of the north summit of PACK MONADNOCK. Eighteen here left the wagons and walked over the two summits and connecting ridge, and were later met by the entire party at the foot of the south peak, and proceeded home. On Saturday, under fair skies, forty-seven persons drove around Grand Monadnock, a distance of thirty miles, and search was made for laurel, but it was found to be in too immature condition for picking. Late in the afternoon a party of twenty-one witnessed from the cottage of Professor Pumpelly a gorgeous sunset, which across Monadnock Lake cast superb tints upon the mountain. Return from the cottage was made by a woodland path to the shore of the lake, where some took boats for an evening row, while others returned home. Sunday morning was lowering and showery. About forty attended church, and little else was done. The weather clearing at noon, twenty-one persons joined in a walk to the top of Beech Hill, where grand views were obtained in all directions, — from the Sandwich range in the north, to Asnebumskit Hill in Paxton, Mass., in the south, and from Greylock in the west to Mt. Agamenticus in the east. Neither Mt. Washington nor Blue Hill were seen while on the excursion. On Sunday evening Mr. A. W. Grabau gave a most interesting and instructive talk upon the geological formation of the region, drawing his conclusions and illustrations from the abundant evidences of glaciation to which he had called attention when in the field. The party returned home on Monday, and by special arrangement an abundant supply of laurel, gathered on lower land, was purchased by them on the train. The weather conditions during the trip were unusually propitious. Rain had fallen in Dublin every day since March 14, so nature was now seen in the sunshine and at its best, and the atmosphere was most bracing at this altitude, which is the same as that of Bethlehem and Jefferson.

The Thirty-second Field Meeting was held at the PROFILE HOUSE, Franconia Mountains, N. H., July 3 to 12, 1897, inclusive. The committee in charge consisted of Mr. Albert S. Parsons, Chairman, Messrs. Parker B. Field and George D. Newcomb, Mrs. David Hall Rice, and Miss Mary A. Furbish.

About seventy persons left Boston in special cars over the Boston and Maine Railroad at 9.30 o'clock Saturday, July 3, and arrived at North Woodstock at 2.20 P. M., where coaches were taken up the Franconia Notch, reaching the Profile House at five o'clock. Another party of twenty-seven took the route via Intervale and Fabyan's, and still others joined the Club on Monday and Tuesday, making the total number one hundred and nine, — forty-seven gentlemen and sixty-two ladies. Thirty-three of the number were guests.

President H. N. Shepard conducted all the meetings of the Club. During the session interesting addresses were given by the Swami Saradananda of India, and Mr. George H. Moses and Hon. N. B. Bryant of the New Hampshire Forestry Commission. At the closing meeting votes of thanks were given to those who had read papers ; to the proprietors of the Profile House and to the committee, for their efforts to make the occasion successful.

On Sunday the members of the party strolled about the neighborhood, visited the Old Man of the Mountain, Bald Mountain, Echo Lake, etc. On Monday, eighty-eight climbed **Mt. Cannon**, though the day was excessively hot. An attempt was made to find the rocks which make up the Profile, but without success. The party returned to dinner. In the afternoon twenty-three took the carriage ride to the Flume. In the evening the Club gave a display of fireworks.

Tuesday morning was very threatening and hot, but twenty-seven persons started at seven o'clock, in charge of Mr. H. C. Parker, with Guide F. P. Clark, to ascend **Mt. Lafayette** and go over the range of Lincoln and Liberty, returning from the Flume House by carriage in time for supper. The views were fine, and, in spite of some showers in the late afternoon, the trip was much enjoyed. Twenty-three others started at nine o'clock, in charge of Mr. Parsons, and made the ascent of Mt. Lafayette, lunching on the summit, where some magnificent cloud effects were seen at close range. Heavy thunder-showers constantly threatened, but not until the party were nearly back to the hotel did they break.

On Wednesday sixty-nine members took the carriage drive to Sugar Hill and Look Off, getting fine views, but suffering greatly from the heat, and, to save the horses, walking many of the hills, arriving back at the Profile House in time for a late dinner.

On Thursday thirty-eight persons took cars at 7.30 A. M. to Gale's River bridge, and thirty-six made the ascent of **Mt. Garfield**, over lumber roads and a new path cut for the Club by Mr. Frank P. Clark, who acted as guide, while Mr. Frank O. Carpenter led the party. The summit was reached at noon, and lunch was taken there, while great masses of thunder-clouds swirled up the valley behind Lafayette, but dissipated without even sprinkling the party on the great mass of rock which makes the summit. The views of the back of the Franconia range and of these awe-inspiring clouds sweeping down from Carrigain were grand in the extreme. The train was taken at the bridge, and the hotel reached at an early supper hour. Mr. Parsons carried up and deposited a Club cylinder and roll, which it is hoped will receive many signatures in addition to those of the largest party which ever climbed this isolated but interesting peak, well worthy the long and arduous climb.

Friday had been assigned to Mount Kinsman, but the great heat which had continued for six days and nights discouraged the attempt, and almost the whole party took the charming walk to **Lonesome Lake**, to the hospitable retreat of Dr. W. C. Prime and Mr. W. F. Bridge. The interest of the walk was greatly increased by the presence of Miss Clara E. Cummings, of Wellesley College, who talked of the Lichens, and illustrated her talk with the great variety which lined the path. Miss Harriet E. Richards, of the Massachusetts Audubon Society, talked of the Birds, to the accompaniment of their songs, and the walk was much enjoyed.

Saturday many of the party went to the Crawford House, but several took the carriage ride to Bethlehem and made the ascent of Mt. Agassiz, lunching on the summit and enjoying the fine views.

On Monday the party left the Profile House at 7.30 A. M., in two special cars, returning to Boston via Fabyan's, Intervale, and Portsmouth. The week was one of the hottest ever known in the mountains, and the midges and black flies caused much discomfort, but in spite of these drawbacks the enjoyment was great and much was accomplished.

The August Camp, Camp Salmacis, was under the charge of Mr. R. B. Lawrence, assisted by Mr. W. R. Davis and Miss M. A. Knowles, and was located on and near the Club land at Randolph, N. H., on the slope of Mt. Madison. Mr. L. M. Watson, of the Ravine House, built a cook shelter and provided the fare. Besides a twenty-five feet marquee for dining and social uses, twenty-two tents, — private, Club property, or hired, — were pitched to accommodate the party, which numbered twenty-nine at one time and thirty-two in all, fifteen ladies and seventeen gentlemen. Camp was open two weeks, from August 13 to August 27. The following is a list of the excursions that were made and the number joining in each: August 14, 15, King's Ravine, Club Hut, and Castellated Ridge, eight. — August 14, Mt. Adams, four; August 15, King's Ravine, Club Hut, and Valleyway, eight; August 15, 16, Cascade Camp and Castellated Ridge, five; four included Mt. Jefferson. — August 16 and 17, Perch, eight. — August 17–19, Perch, Mt. Washington and Perch again, eight. — August 18, Pond of Safety, sixteen. — August 19, 20, Camp Crawford, twelve; three included Mt. Washington, three the Castles, and nine Mt. Jefferson. — August 20, Ice Gulch, nine. — August 21, Coösauk Falls, sixteen. — Salmacis Falls, nine. — The Ledge, three. — August 21, 22, Valleyway, Club Hut, and Mt. Madison, seven. — August 21–23, Perch, Mt. Washington, and Perch again, five. — August 22, Ice Gulch, three. — August 22, 23, Club Hut, Mts. Madison, and Adams, three. — August 23, the Club land at the Lead Mine Bridge, fourteen. — August 24 and 25, Carter-Moriah Range, five. — August 24, King's Ravine, and Club Hut, nine. — August 25, Ice Gulch, seven. — August 25 and 26, Cascade Camp, four, including one to the Castles. — August 26, Club Hut, and Mt. Adams, eight. There were other small parties to Coösauk, Salmacis, and Cold Brook Falls, the Ledge and the Ridgeway. The guides employed were Thaddeus and Vyron Lowe and Eugene Hunt. The party had some bad weather, but plans were carried out in spite of it. All appreciated the attractions of the Club land, with its fine forest and beautiful brook, and wished that its borders might be extended up the Valleyway, even to the Club Hut at Madison Spring.

The Labor Day Excursion to the Isles of Shoals, September 4 to 7 inclusive, was conducted by Mr. Charles E. Lord, and participated in by fifty-four members and friends.

The party left Boston by the Boston and Maine Railroad, at 9.40 A. M., Saturday, September 4, arriving at Portsmouth about eleven, and transferring to the steamer "Viking," sailed down the Piscataqua, past Whaleback Light, and across the open sea to Appledore, the largest of the group of islands known as the Isles of Shoals.

The afternoon was spent in rambling over the island, exploring its many points of interest, and becoming acquainted with the surroundings.

The next day a large number of the party chartered the schooner "Flying Eagle" for a voyage to Star Island. Fort Star, the old Church, the monument to Captain John Smith, and Betty Moody's Cave, were each visited in their turn, and at 12.30 P. M. the party were on their way back to Appledore.

In the afternoon the "Flying Eagle" was again boarded, and a complete circuit of the islands was made.

On Monday there was a trip to White Island, and the Lighthouse, famous as the childhood home of Celia Thaxter, was visited.

In the afternoon the botanizing division explored Smutty Nose, an island between Appledore and Star Island. Those who remained on Appledore visited Celia Thaxter's cottage and grave.

In the evening, those who wished enjoyed a moonlight sail, and with a stiff breeze, yet a smooth sea, cruised about the islands for some hours.

Up to this time the sea had been very smooth with but little wind, but Tuesday morning brought a change. The wind hauled round to the east, and those who were awake early hastened to the headlands to watch the white-capped waves.

The party left Appledore at 9.15 A. M. by the steamer "Viking," and after a short sail, which nearly all enjoyed, despite the heavy sea, were landed safely at Portsmouth, and taking the train arrived in Boston at 12.50 P. M.

The Autumn Excursion, the last for the year, was to the Berkshire Hills, from October 2 to 11, and NORFOLK, CONN., was the centre of operations. Mr. Ephraim Harrington was in charge. The party left Boston at 8.30 A. M. and arrived at the Stevens House, Norfolk, at 2.40 P. M., in time for a late dinner. There were fifty-nine in the party during the trip. On the evening after arrival the members visited the gymnasium and the public library, which are maintained in a most artistic and complete manner by private individuals, for the use of the public. These two buildings were found to be convenient and cheerful places of rendezvous, and were much used by the members. Sunday forenoon was occupied in church-going and short walks. In the afternoon about thirty-four of the party went to drive. On Monday the entire party took wagons to the foot of Mt. Wangum, or Canaan Mt., about seven miles, where the majority walked to the top, the rest driving home to dinner. The day was warm and pleasant and fairly clear, permitting a good view from the top, where the party lunched. After a rest of about an hour, steps were retraced to the carriages, and return was made in time for dinner at 6 P. M. On Tuesday a party of thirty-seven took an early train for Chapinville, after which a pleasant drive of about two miles brought them to the entrance of Sage's Ravine. The next two hours were spent in scrambling up steep hillsides and through bushy growth to a point near the head of the Ravine, the lunching place. After lunch return was made to the wagon, and the hotel was reached in good season. On Wednesday an early train was taken to Stockbridge, Mass., from which place the party of forty-six drove through beautiful Lenox and its surroundings. The trip proved most enjoyable to all, and entirely new to the majority. Thursday was the first day of rest for those who wished it. A few took the trip to Lenox. Dudley Hill and the charcoal-burners were visited by a party of a dozen or more in the forenoon, and a walk to the golf grounds occupied the remainder of the day. Friday a party of seventeen visited the East Canaan lime kilns, which are run with both wood and oil, also to the smelting furnaces. They later strolled through a quite historic region and climbed a spur of Mt. Wangum, and returned to Norfolk by an early train. Saturday the party began to break up, and by night was reduced to thirty-five. A party drove to the south of Norfolk, also twelve members took a train to Chapinville, and walked from there to and up Bear Mountain. The foothills are so cut up with new and old wood roads that it is very easy to miss the trail, which was the fate of this party, which necessitated a tramp of about a mile through scrub growth. From the top of Bear Mountain, which is marked by a high cairn, a fair view was obtained in all directions, but especially to the west, where the length of the Catskill range was finely presented. After luncheon and a rest return was made in two parties. The second party of five catching the early train home, while the seven who started earlier took a path by way of Salisbury and reached the hotel by a later train. Sunday was spent in attending church and in short walks.

On Monday the party bade farewell to Norfolk at 10 A. M., had a wait of two hours in Hartford, enabling them to visit the capitol, and arrived in Boston at about 6 P. M. Fair weather prevailed throughout the trip.

ALL-DAY OUTINGS.

On Washington's Birthday twelve snow-shoers, led by Mr. R. B. Mackintosh, spent the day in the Lynn Woods, visiting in turn Dungeon Rock, Mt. Gilead, Weetamoo Cliff (better known as the Bowlder Camp), and finally Bow Ridge, where the camp which bears its name was thrown open for the use of the party.

On Patriot's Day Messrs. G. D. Newcomb and J. A. Crosby took a party of ninety-two from Green Lodge over Little Blue, Big Blue, and Hancock hills, and returned by way of the Crossman place and Brush Hill (Fairmount) to Hyde Park.

The April Walk (April 24) was taken through Kingston and Duxbury by eighty-three persons, led by Messrs. W. L. Chaloner and P. B. Field. Many mayflowers were gathered and the party visited the sites of the homes of Miles Standish and Elder Brewster, also the Standish Monument on Captain's Hill and the grave of Standish.

The May Walk (May 15) was led by Mr. R. B. Mackintosh, and forty-five persons were afforded a most interesting trip on Cape Ann, over Lamb Ledge and across Dogtown Common.

The Memorial Day Walk was postponed until Labor Day, on account of rainy weather.

On June 17 a Harbor Excursion was conducted by Messrs. G. D. Newcomb and J. A. Crosby. One hundred and twenty-eight persons embarked on two towboats and cruised to Baker's Island and the Light Ship.

On Labor Day Mr. Ephraim Harrington conducted a party of seventy-eight along the right bank of the Merrimac River from Lowell to Fish Brook, about five miles. A steamer was then taken for about the same distance, to Lawrence, where the party was hospitably entertained by the Lawrence Canoe Club. Hospitality was also extended at the home of Mr. J. W. Pead, of Lowell, and Mr. Harrington was assisted in his arrangements by Mr. R. A. Hale of Lawrence.

A walk in Andover, planned for Election Day, was postponed on account of rain to November 13, when Mr. P. B. Field led a party of twenty-six over Indian Ridge, in that town. Later, after visiting the ancient Abbott homestead, the party lunched in the Science building of Phillips Academy, and then, after passing by the Theological Seminary and the home and grave of Harriet Beecher Stowe, climbed Holt's (Prospect) Hill and obtained a magnificent view, from Blue Hill, in Milton, to snow-covered Monadnock.

Indian Ridge is a remarkable eskar, covered with a fine growth of venerable pines, and certain persons were, at the time of the Club visit, making efforts to secure it as a forest reserve. It is hoped that the visit of the Club, and subsequent letters of encouragement from our Trustees of Real Estate and individual members, may have assisted in bringing about the purchase of the tract, which occurred about a month later.

HALF-DAY OUTINGS.

There appears to be no abatement of interest in the Saturday outings. The responsibility for them has been divided as evenly as possible between the members of our Committee, though one, through his fidelity and zeal, has many times acted as a substitute for others. Of the thirty-four half-day walks one has been been led by each of the following persons: Mr. Frederick Bancroft, Mr. J. R. Carret, Mr. H. A. Carson, Mr. W. L. Chaloner, Mr. E. G. Chamberlain, Mr. F. V. Fuller, Mr. E. W. Howe, Mr. R. B. Lawrence, Mr. W. H. Manning, Mr. A. S. Parsons, Mrs. L. B. Tarleton, and Mrs. W. O. Witherell. Two have been led by Mr. C. M. Cox and Mr. P. B. Field; three by Mr. A. R. Bailey, Mr. C. C. Hall, Mr. G. D. Newcomb, and Mr. J. B. Osborne, and five by Mr. A. S. Lynde. Almost every locality about Boston has been visited.

It has not been the policy of this Committee to purposely swell its treasury through the assessment of members, but it has this year so happened that a number of anticipated expenses on some trips have not been incurred, and we have therefore been able to hand the Club Treasurer $155, reserving $54.46 for the use of the next Committee. The value of the railroad tickets on hand has been reduced from $72.24, at the opening of the year, to $49.63 at the present time.

Your committee has noted with satisfaction the growing interest of the community in outdoor life, which has been so apparent in recent years, and they feel that our members should be offered in the future as many opportunities as possible to leave the city for the woods and hills, ever keeping the higher aims of the Club in view, and allowing no degeneration from the dignity which parties from this Club should always maintain.

PARKER B. FIELD,
ALVIN R. BAILEY,
GEORGE D. NEWCOMB,
JOHN B. OSBORN,
EPHRAIM HARRINGTON,
RICHARDS B. MACINTOSH,
CHARLES E. LORD,

Committee on Field Meetings and Excursions.

BOSTON, December 31, 1897.

Proceedings of the Club.

July 3 to 12, 1897. — Thirty-second Field Meeting. Held at the Profile House, White Mountains, N. H.

President Shepard in the chair.

The meeting for the presentation of papers was held in the parlor of the Profile House, Wednesday evening, July 7. Eighty-two persons were present.

Mr. A. S. Parsons, chairman of the committee on the Field Meeting, gave various notices relating to excursions. The President then introduced the subject of the evening, "The Preservation of Forests," mentioning the present status of legislation in Massachusetts and New Hampshire.

Mr. George H. Moses, Secretary of the New Hampshire Forestry Commission, spoke at some length, saying that although the State Legislature had done but little, Hon. Charles H. Greenleaf, the proprietor of the Profile House, had spoken forcibly in the State Senate in favor of forest preservation. Mr. Moses stated that the Legislature had authorized the Commission to make an investigation into the most feasible means of acquiring forest lands, and that attention was being given to the preservation of shade trees on the public highways. He alluded to the feasibility of the State's establishing a preserve in the mountain region, and stated that owners of forest lands were gradually becoming convinced that scientific forestry would be to their advantage.

Mr. N. P. Bryant, of the Commission, after alluding to what the Club had done for New Hampshire, said that the preservation of the forest was entirely consistent with its utilization. We should cut only the mature trees, and thus secure a continuous harvest. The present generation owes something to posterity. We have received the forests from our fathers and must hand them over unimpaired to our successors.

Upon the following evening Miss Harriet E. Richards addressed those present upon the birds of the region. On another occasion Professor C. E. Cummings, of Wellesley College, gave a talk in the woods on "Lichens."

October 20, 1897. — One Hundred and Seventy-sixth Corporate Meeting.

President Shepard in the chair.

Seventy persons were present. Twenty-eight candidates for membership were elected.

The President appointed as the Committee to nominate officers, Charles E. Fay, William H. Cades, Ralph C. Larrabee, Agnes W. Lincoln, and Mary A. Furbish.

Mr. Ritchie invited members to join in a search next Friday for a meteorological instrument lost from a kite on Blue Hill.

Two short papers relating to an ascent of Orizaba, Mexico, prepared by Messrs. A. E. Douglass and W. A. Cogshall, were read by Mr. R. F. Curtis. The former paper gave valuable statistics and some observations on mountain sickness. The elevation was calculated to be 18,295 feet, with a possible error of ± 160 feet. (See pp. 350, 356, 361.)

Mr. Amadeus W. Grabau addressed the Club concerning some drift phenomena in the vicinity of Boston, treating especially of glacial Lake Bouvé and other glacial lakes of the region. Many fine lantern views were shown, illustrating moraines, sand plains, drumlins, eskars, boulders, etc., the last one being a view of Indian Ridge, in Andover, which the Club expects to visit on November 2, and which it is very desirable to preserve from destruction.

November 10, 1897.— One Hundred and Seventy-seventh Corporate Meeting.

President Shepard in the chair.

One hundred and thirty-five persons were present. Eight candidates for membership were elected.

The President appointed as Auditing Committee Cheever Newhall and Ernest N. Boyden, and as Reception Committee James R. Carret, Parker B. Field, F. Vincent Fuller, Mrs. James R. Carret, and Miss Dora Williams.

Professor William Morris Davis addressed the Club on the Harvard Geographical Models. After alluding to the inadequate instruction formerly given in geography and to the poor textbooks, the speaker by means of his three models illustrated the improved methods of instruction. The models showed a section of coast land, with rivers running from the mountains to the sea. One showed the region after depression, the old valleys having been drowned, and another showed the region after elevation, new low land, coast line, deltas, etc., having been formed. Lantern views of the models in different positions were also used in illustration. The hope was expressed that some publisher would undertake to make such models at a nominal price. Additional remarks were made by Professor W. H. Niles and the Recording Secretary.

December 15, 1897. — One Hundred and Seventy-eighth Corporate Meeting.

President Shepard in the chair.

About one hundred and eighty-five persons were present. Twenty candidates for membership were elected.

The President announced the death of Gardiner G. Hubbard, an Honorary Member of the Appalachian Mountain Club. Professor William H. Niles then spoke concerning the life and work of the deceased, and particularly of his influence as President of the National Geographic Society, and of his interest in our Club. The speaker desired that there should go upon our record an expression of our appreciation of him as a man and as a worker in our own line of activity, and also as an expression of our feeling at his loss.

The President also announced the gift to the Club, by ex-President Albert S. Parsons and relatives, of forty acres of land in Warwick, Mass., including the northern peak of Mt. Grace. This is the first gift to the Club of land in Massachusetts. A vote of thanks to Mr. Parsons and his relatives was passed for this generous gift. Mr. J. Ritchie, Jr., then gave a description of the mountain, illustrating his remarks with the stereopticon.

The two papers of the evening described explorations the past summer in British Columbia. Rev. Charles L. Noyes read a charming paper describing the training climbs of the party of 1897 in the Selkirks. Professor Charles E. Fay spoke concerning the ascents of Mt. Lefroy and Mt. Green (Mt. Victoria). Views of grand and beautiful scenery, of lake, glacier, and rocky peak, were thrown upon the screen.

January 12, 1898. — One Hundred and Seventy-ninth (Annual) Corporate Meeting.

President Shepard in the chair.

Eighty-five persons were present. Eight candidates for membership were elected.

The Councillors of Topography, Art, Exploration, and Improvements presented their annual reports. The Councillor of Art also presented the report of the Committee on the Sella Collection.

The annual reports of the Recording and Corresponding Secretaries, Treasurer, Trustees of the Permanent and Reserve Funds, Auditors, Trustees of Real Estate, Room Committee, and Excursion Committee, were presented.

The Committee on the Nomination of Officers for 1898 made the following report: —

For President, William H. Niles; for Vice-President, Rest F. Curtis; for Recording Secretary, Rosewell B. Lawrence; for Corresponding Secretary, John Ritchie, Jr.; for Treasurer, John E. Alden; for Councillor of Natural History, A. Lawrence Rotch; for Councillor of Topography, Gordon H. Taylor; for Councillor of Art, Helen E. Endicott; for Councillor of Exploration, Charles L. Noyes; for Councillor of Improvements, Parker B. Field; for Trustee of the Permanent and Reserve Funds (for three years), Isaac Y. Chubbuck; for Trustee of Real Estate (for four years), Harvey N. Shepard.

The balloting for officers resulted in the election of the candidates nominated. With appreciative remarks President Shepard thanked the Club for the kindness extended to him during his year of office. He appointed ex-President Fay a committee to escort the President elect to the chair, and Professor Niles assumed the duties of the position with assurances to the Club of his great interest in all the branches of its work and of his hope for a prosperous year.

January 19, 1898. — Special Meeting.

President Niles in the chair.

About one hundred and seventy-five persons were present.

Mr. A. S. Parsons moved that a committee of five, of which the President should be one, be appointed by the Chair, to meet a committee of persons interested in Forestry for conference as to forming a Forestry Section of the Appalachian Mountain Club. The Chair appointed Messrs. Albert S. Parsons, Harvey N. Shepard, Charles E. Fay, and J. Rayner Edmands.

Mr. Edwin S. Balch, of Philadelphia, presented an interesting paper, entitled, "Reminiscences of Tyrol." (See p. 337.) Several lantern views were shown.

A paper by Mr. Jean Habel, entitled "The North Fork of the Wapta River," was read by Mr. Edwin A. Start. (See p. 327.) A few views were shown.

Professor C. E. Fay read a paper prepared by Mr. Charles S. Thompson, entitled, "At the Headwaters of the Bow." (See p. 320.) A large number of interesting and beautiful views were thrown upon the screen.

February 9, 1898. — One Hundred and Eightieth Corporate Meeting.

President Niles in the chair.

About two hundred and twenty-five persons were present. Twelve candidates for membership were elected.

The committee appointed at the last meeting to consider the formation of a Forestry Section reported that it was not expedient to take any action. The report was accepted, and the committee discharged.

Mr. A. S. Parsons invited members of the Club, particularly snow-shoers, to accompany him to Warwick and Mount Grace, for February 22d.

Mr. Henry G. Peabody delivered his illustrated lecture on the White Mountains. The audience accompanied the speaker on a general tour of the whole mountain region, and ninety-two beautiful stereopticon views were shown, illustrating the scenery at all seasons of the year. Most of the views were colored, and among the finest were those showing the autumnal foliage in the valleys and upon the mountain slopes, while the summits were snow-capped. Particularly interesting were the telescopic views of Mount Washington taken from Lake Winnipesaukee.

Officers for 1898.

President.

William H. Niles, Institute of Technology, Boston.

Vice-President.

Rest F. Curtis, 18 St. Stephen Street, Boston.

Recording Secretary.

Rosewell B. Lawrence, Tremont Building, Room 745, Boston.

Corresponding Secretary.

John Ritchie, Jr., Box 2725, Boston.

Treasurer.

John E. Alden, Tremont Building, Room 1049, Boston.

Councillors.

Natural History, A. Lawrence Rotch, Boston.
Topography, Gordon H. Taylor, Boston.
Art, Helen E. Endicott, Canton.
Exploration, Charles L. Noyes, Somerville.
Improvements, Parker B. Field, Milton.

Trustees of Permanent and Reserve Funds.

Rest F. Curtis. Isaac Y. Chubbuck. Charles H. French.

Trustees of Real Estate.

Harvey N. Shepard. Augustus E. Scott.
J. Rayner Edmands. Charles E. Fay.
Charles L. Noyes, *Ex officio.*

Members added since May, 1897.

Alden, Miss Flora, Salem.
Banchor, Franklin, Newtonville.
Banchor, Mrs. Franklin, Newtonville.
Bauer, Frederic G., Jamaica Plain.
Beede, J. F., Meredith, N. H.
Blake, Clarence J., Boston.
Breed, Miss Nellie J., Dorchester.
Brooks, Miss S. W., Cambridgeport.
Brown, Miss Irene M., West Roxbury.
Butterfield, E. S., Somerville.
Chamberlain, A. C. Allen, Winchester.
Chamberlain, Mrs. A. C. A., Winchester.
Chick, Charles G., Hyde Park.
Comey, Arthur M., Cambridge.
Delafield, Maturin L., Jr., New York City.
Denny, Clarence B., Hyde Park.
Denny, Mrs. Clarence B., Hyde Park.
Downes, Chas. S., Medford.
Dykes, Alfred, Winchester.
Ely, Robert E., Cambridge.
Emerson, Miss Marion B., Methuen.
Farr, Frank, Lawrence.
Faxon, F. W., Roxbury.
French, Alexis H., Brookline.
French, Mrs. Alexis H., Brookline.
French, James W., Boston.
Friend, John C., Concord.
Hall, Miss Belle S., Somerville.
Harris, Miss Sylvia F., Cambridge.
Haven, William I., Brookline.
Holmes, Joseph E., Cambridgeport.
Holt, Henry C., Winchester.
Holton, Miss A. K., Winchester.
Hope, Arthur L., Lowell.
Ingalls, Mrs. Sarah Palmer, Swampscott.
James, Mrs. Chas. L., Brookline.
Janes, Lewis G., Cambridge.
Kimball, Frank W., Lynn.
Leighton, Walter L., Roxbury.
Lewis, Miss M. E., Boston.
Merriam, Miss Annie F., Boston.
Merrill, Miss A. M., Somerville.
Metcalf, Miss Lucy A., Providence, R. I.
Morehouse, Wilmot L., Brooklyn, N. Y.
Morton, Johnson, Boston.
Mudge, Miss Kate G., Salem.
Murphy, Gardner E., Brighton.
Noyes, Miss M. E., Boston.
Olmsted, John C., Brookline.
Partridge, Lasell E., Boston.
Pease, Mrs. T. C., Andover.
Pennock, Edward A., Roxbury.
Pickard, Mrs. E. W., Boston.
Potter, Geo. S., Cambridge.
Richards, Miss H. E., Boston.
Ross, Leonard W., Boston.
Sanders, Chas. H., Pennacook, N. H.
Saunderson, Miss S., Lynn.
Smith, Miss Edith G., Dorchester.
Smith, Harrison W., Dorchester.
Spalding, Fred M., Cambridge.
Spencer, Mrs. E. K., Dorchester.
Symonds, Warren L., Lynn.
Taylor, Edward M., Roxbury.
Tompson, Miss Grace, Newtonville.
Tompson, Miss Kittie, Newtonville.
Tower, Mrs. Levi, Brookline.
Towle, Henry C., Dorchester.
Treat, Miss N. Florence, Chelsea.
Wakefield, John Lathrop, Boston.
Ware, Leonard, Boston.
West, Thomas, Somerville.
Whipple, Geo. N., Boston.
Wight, E. L. Capen, Brookline.
Wilder, Frederick W., Woodstock, Vt.
Willcutt, Levi L., Boston.
Winkley, J. W., Boston.
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Wrightington, Chas. W., Boston.

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